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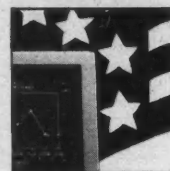
JUNE 25, 1984

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Next week

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NEWSPAPER

Open market: new services, lower prices



THE CHANGING WORLD OF INTERNATIONAL COMMUNICATIONS

By John Dix
and Susan Blakeney
CW Staff

Part one of a three-part series.

Regulations meant to spur competition between international communications carriers, together with an increased emphasis on international trade by American businesses, are changing the shape of overseas communications services.

That market has traditionally been divided into international data or message services and international voice services. While that division remains, it is growing harder to pigeonhole carriers as providers of one or the other — and harder still to differentiate between domestic and international carriers.

Most of the change in international services has occurred in the overseas data and message services market. These services traditionally have been provided by international record carriers, whose bread-and-butter service is telex — transmission of a 50 bit/sec data stream that is received by a teleprinter, which prints out a hard-copy message.

Leased-line service

The second most prevalent IRC service is leased lines. Supplied in a variety of ways, under a host of different trade names, leased-line service is typically used for voice, voice/data or data, supported at different rates.

Technologically, IRC services are evolving more slowly than similar domestic services. Limiting their advance are the lack of complementary technology in the countries that would be served and the problems inherent in dealing with government-controlled communications agencies in a number of countries.

The overseas connection is thus often the weakest link in efforts to create technologically advanced international services. New domestic message services, for example, will enable users to send various types of messages from a variety of devices, such as mainframes and personal computers. "But when [the message] ends up overseas, it still comes out as a 50 [bit/sec] telex," observed Russ Borgman, vice-president of marketing at FTC Communications, Inc., an IRC based in New York.

This does not mean, however, that the international communications industry is immune to change. Federal regulations put in place in 1981 have turned the industry on its ear. Competition is rife, and the traditional carriers are bracing to do battle with a growing host of newcomers.

To users, perhaps the single most evident change in international communications has resulted from the removal of the

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TOP OF THE NEWS

Staffers at Merrill Lynch are bullish on a large-scale prototyping effort recently completed at the investment giant's New York headquarters. Page 6.

How do you spell relief for a six-year applications backlog? Higbee Co., a Cleveland department store, used a healthy dose of Burroughs Corp. B20 micros, putting more power in the hands of its end users. Page 10.

The fine art of communications will be practiced in more ways than one when the Democratic National Convention kicks off next month in San Francisco, where Pacific Bell Telephone Co. is assembling a massive temporary communications network to harvest all the political hay. Page 11.

Anyone seen a 60-foot ocean racer around? It was questions like this one that were readily answered with the aid of Wang Laboratories, Inc. micros last week as a 3,200-mile, trans-Atlantic sailboat race concluded in Newport, R.I. Page 16.

The first major minicomputer maker with a fully supported version of Unix System V is what Perkin-Elmer Corp. became with its recent announcement of the Xelos Unix derivative. Page 51.

Light in shining armor? That's what a recent report on nonimpact printers makes of laser printers, claiming that 1985 just might be the year of the laser printer. Page 69.

IBM 3270-PC finding base in DP shops

By Paul Korzeniowski
CW Staff

First customers of the IBM 3270 Personal Computer are experimenting with potential end-user applications while anxiously awaiting software that will transform the 3270-PC into a complete end-user microcomputer-to-mainframe link.

Further, they told *Computerworld* in recent interviews, the 3270-PC is replacing other multisession terminals — those that concurrently support mainframe applications — and finding a home in DP operations rather than sitting on middle managers' desks.

At North American Life and Casualty Co. in Minneapolis, "System programmers are the primary users of the 3270-PC," said Dennie Nielsen, MIS director. "It provides a lot of flexibility for complex system requirements, such as installing a new operating system."

Other 3270-PC administrators interviewed echoed Nielsen's opinion that the microcomputer is currently more useful to system programmers than to middle managers. They seemed satisfied with the 3270-PC's ability to translate mainframe Ebcid files to Personal Computer Ascll files, but pointed out that this translation is only one step in the complicated process of transforming microcomputer data into useful mainframe data and vice versa.

"The end user wants to take data from an [Information Builders, Inc.] Focus data base and use it with [Lotus Development Corp.'s] 1-2-3," explained John Selmer, information center manager at American

See IBM page 8

FOLLOW-UP

Del Monte DP staff goes home again

By Jeffrey Beeler
CW West Coast Bureau

SAN FRANCISCO — For nearly a year, they were banished from their own corporate home and were forced to live their professional lives as refugees.

For nearly a year, they watched as their once-unified organization was carved into little pieces and scattered to the four winds. For nearly a year, they struggled against the communications breakdowns and organizational disarray that invariably accompany a sudden, traumatic dislocation.

But the hard times are all behind them now, painful memories slowly receding into the past. No longer are the 150 members of Del Monte Corp.'s Information Resources Department battling to keep their heads above water in an unfamiliar, inappropriate workplace. After a prolonged exile in makeshift business of-

fices, the Information Resources staff members have finally returned to the corporate data center that a freak accident had forced them to flee. At long last, Del Monte's systems specialists are again enjoying the comforts and conveniences of home.

With the Information Resources Department's recent return to its former haunts, the curtain has finally fallen on a continuing disaster story that began without warning more than a year ago. On a quiet Sunday morning in May 1983, while a skeleton crew was on duty in Del Monte's corporate MIS facility, an electrical transformer in the basement of the company's headquarters exploded and caught fire [CW, July 4, 1983].

Although the fire was small and was quickly contained, it released a cloud of toxic chemicals that infiltrated parts

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NEWS

Evacuation of data center didn't halt two major projects

SAN FRANCISCO — Del Monte Corp.'s hasty evacuation of its corporate data center — and the ensuing 11-month separation — greatly complicated efforts by the firm's Information Resources Department to develop and implement new applications.

"While we were trying to get back on our feet in our alternative site, the company's business wasn't standing still," according to Del Monte's Information Resources vice-president, Kerry Coin. "We were still expected to complete a couple of major development projects on schedule," even though the systems department was unable for a long time to gain access to its headquarters' data center, he said.

One of the projects called for the creation of a

plant accounting system, which encompassed four or five large applications. The other critical development effort involved the fundamental redesign of a sales and order-entry system, which the Information Resources Department was required to make operational in time for Del Monte's peak selling season, Coin said.

"Although the temporary loss of our data center cost us several man-months of development effort up front, our Information Resources Department was still able to pull off both projects on time," he said. "I attribute the feat to a lot of long hours, a superhuman effort by all our people and a high level of esprit de corps."

For the most part, of course, the evacuation of Del Monte's corporate data center proved an in-

convenience and an unwelcome intrusion. At the same time, however, the unscheduled departure also yielded some unexpected dividends.

"For one thing, the separation accelerated by three to six months our plan to provide every member of our development group with a dedicated terminal," according to Lowman McCauley, director of the firm's management information systems support services.

The dislocation also reportedly forced Del Monte to re-examine and upgrade its disaster recovery plan. "From now on," Coin said, "disaster recovery planning will get more attention and resources here than we gave it in the past. It may even become a full-time job for one of our employees."

HOME from page 1

of Del Monte's nerve center at One Market Plaza and forced the firm to evacuate its corporate computing shop.

Because the Information Resources Department had earlier installed its own independent ventilation system, the machine room reportedly emerged from the disaster without even the slightest trace of chemical contamination. But as a safety precaution, the San Francisco Department of Public Health still forbade the company's systems employees from reoccupying their hastily abandoned workplace.

Thus, in one moment of catastrophic misfortune, a \$2.5 billion supplier of diversified food products was rudely stripped of the hub of its international telecommunications and information processing network. Lost, too, was much of the firm's capacity to conduct routine business.

Within a few days, Del Monte was able to scrounge replacements for its suddenly off-limits hardware, improvise a backup data center in an off-site location and resume information processing operations with minimal disruption. The result was that the firm was knocked out of commission for only one full business day and restored its normal administrative activities without losing a sin-

gle customer order, according to a company spokesman.

But Del Monte's success in speedily replicating its inaccessible MIS facility was achieved at a high price: A systems operation that had previously been consolidated on one floor of the same office building suddenly found itself distributed among six locations throughout this city's financial district.

"Our mainframe [an IBM 3083] was housed not too far from here at a site on Sansome St.," Del Monte's Information Resources vice-president, Kerry Coin, recalled during an interview shortly after the company's homecoming. "Our applications development group was located in a second building, and our office services section was in yet another location."

At first, the breakup of Del Monte's Information Resources Department was scheduled to last only until the following Thanksgiving, by which time the firm had hoped to have its tainted headquarters fully refurbished and ready for reoccupation. But unavoidable hitches in reconnecting the company's four transcontinental communications lines and in gaining the necessary authorization from the local health department delayed the planned return for another five months, Coin said.

Not until April 20 — Good Friday — did Del

Monte finally get the go-ahead to begin the long-awaited trek back to the corporate data center it had so unceremoniously forsaken approximately 11 months earlier.

"It's like the difference between night and day," Coin said when asked to compare the firm's makeshift data center to the permanent MIS facility Del Monte recently reclaimed. "As I see it, the big advantage of being back [in our headquarters building] is proximity. It's much easier to see and meet people when they're all together in the same location than when they're spread out all over the place."

Coin's observation is echoed by Lowman McCauley, director of Del Monte's MIS support services. "The move back to our corporate data center has improved communications among peers," McCauley said.

"Our applications and operations people are accustomed to being in the same location, and when they're suddenly physically separated, there's always the potential for blunders and misunderstandings," he said.

In addition to erecting imposing barriers to interpersonal communication, Del Monte's summary expulsion from its main data center hindered the Information Resources Department's efforts to disseminate printed output, McCauley said.

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NEWS



FIRST USER

Bank finds PIC flexible

Working toward remote communications

By Eric Bender
CW Staff

NEW YORK — Wang Laboratories, Inc. promoted its PIC Image Processing System at last October's introduction as "the single most powerful and fully integrated office automation tool available today." This claim is now being tested as early customers develop applications for the Wang Professional Computer-based PIC, which began shipping in March.

Among the first users is Chemical Bank, which received its first PIC in April. Craig Atkinson, assistant vice-president for information services in the Bankwide Office Systems group, gives the PIC high marks for flexibility and expects the system to find significant uses in electronic mail and elsewhere.

"Image processing has been around for a while," but is commonly limited to straightforward storage and retrieval of images, he said. "Wang has gone to the next level."

Atkinson commented that Chemical Bank was still early in its PIC development work, but predicted that "we may have 25 installed by the end of the year."

Chemical Bank's first working use is likely to be in transferring credit-file-type documents from a Delaware subsidiary, Atkinson said. His group set up a remote communications link with PICs in the lab this month, and he estimated that a working link will be established around September.

'Tremendous applications'

Atkinson also predicted "tremendous applications" for international electronic mail or other forms of communications via PICs hooked up to larger Wang systems. He noted the current difficulty of sending documents between branches around the world, with some pouch or messenger deliveries often taking days.

The PIC's imaging and manipulation capabilities could provide obvious benefits in some of these applica-

tions, Atkinson said. However, he cautioned that "we don't want to use it as a replacement for facsimile per se — it's too expensive."

Although Wang's marketing executives often emphasize departmental or intrabuilding office automation uses for the PIC, Atkinson expected Chemical Bank to set up such remote communications uses first.

"Initially, at least, I don't see a cluster of PICs on any given floor, but rather building-to-building applications," Atkinson said. He predicted greater use for the PIC within offices when larger Wang systems, such as the VS series, offer "distribution of imaging records and where regular VS terminals can view them."

Another potential use for PICs — signature verification — "really didn't come from us," said Daniel Lederman, assistant manager of information services. Instead, the idea was suggested by a top bank executive seeing the PIC for the first time.

Get end users involved

"The people on the banking side, the people out there dealing with customers, know their business a lot better than we do," Atkinson commented.

He suggested that the best way to tap the potential of innovative technology is to show end users some possibilities, start to answer their questions and get them involved.

One route is through another Bankwide Office Systems project, the Office Technology Center in Manhattan. The center is set up like a company store with "every type of [personal computer] and almost every type of office system" approved by the bank on display, and the PIC has become one of the most popular systems on exhibit, according to Atkinson.

"We'll give end users whatever support they need," Lederman said. "A lot of hand-holding will be required."

As beta test site, Chemical Bank reaped advantages, 'some grief'

By Eric Bender
CW Staff

NEW YORK — The staff of Chemical Bank's Bankwide Office Systems group here first saw the Wang Laboratories, Inc. PIC Image Processing System in development form in spring 1983, and a secondary beta test system was delivered to the bank last April.

As Wang modified the PIC from the configuration shown in October, "the original beta tests got hardware and software that did not resemble what we got," according to Craig Atkinson, assistant vice-president for information services.

Atkinson acknowledged the advantages in beta testing and pointed out that "you get some of the grief as well." Testing brought out several minor bugs, such as system crashes when the 100th field was filled in the forms-fill application, and some promising enhancements, Lederman said. Dealings with Wang were satisfactory during the testing, he said.

Chemical Bank is moving through three phases with its development, according to Atkinson.

The first is a getting-acquainted stage; the second is establishing PIC-to-PIC links; and a third is hooking the PIC into Wang OIS or VS systems.

The technology will really take off when PICs can connect fully to the larger Wang systems and images can be integrated with existing Wang data bases on a distributed network, Atkinson suggested. Integrating PICs with the larger machines will require both software development and new dedicated imaging terminals for the larger machines, Lederman noted.

Further down the road, the Wang Systems Network looks like an at-

tractive foundation for extending communications beyond the host machine, he said. "Word processing documents, data files, images, anything — all will run over the same lines."

Lederman pointed out that the PIC's imaging approach is completely different from the image-viewing setup for 3270-type terminals, which IBM announced last February. Images converted by IBM's Scanmaster fit into IBM's Distributed Office Support Software scheme, but the setup provides much less flexibility in handling images than does the PIC, he commented.

Like other users, Chemical Bank is eagerly awaiting Wang's promised delivery of software, which transfers data base information into PIC's forms-fill application. "To simply put data in forms fill, instead of working with a program, is always a programmer's dream," Lederman said. When this transfer facility is available for both PIC and other Wang data bases, "they'll have a fantastic product," he said.

Chemical Bank also would like to replace the PIC's current thermal printers with laser printers hooked up through the bank's VS systems. Wang has scheduled a laser printing option for August shipment.

Another current drawback is external storage. Wang's new 30M-byte hard disk drive will prove useful, but storage limitations may not be overcome until commercial laser disk systems are widely available, Atkinson said.

According to Atkinson, pricing for the PIC seems reasonable, as it can function either as a PIC, a Wang Professional Computer or a Wang workstation. "In a year or two, the PIC might even be one of Wang's really big products," he said.

CORRECTIONS

"Microcomputers await true intelligence" [CW, May 7] should have stated that a microcomputer-based version of Artificial Intelligence Corp.'s Intellect would require 512K bytes of memory. In addition, Jane Eysenberg is the company's director of microcomputer products.

In "Interactive net boosts Pactel's DP, customer service" [CW, May 14], the Pacific Telesis Group (Pactel) was identified as the topic of the story. The story was actually about Pacific Bell Telephone Co. Pactel is the holding company for Pacific Bell, which is the operating company. In addition, the interactive communications system involves some 10,000 rather than 100,000 shared terminals and circuits.

By earning warrants, GTE Com-

munication Systems Corp. will acquire a 20% interest of Sysdis, Inc. over a period of time.

GTE Communications Systems does not currently hold that interest, as reported in the May 14 issue of *Computerworld*.

Hayes Microcomputer Product, Inc.'s Please [CW, June 4] sells for \$349, not \$395.

The printing speed of Bell & Howell, Inc.'s 6601 printer was erroneously reported in the June 18 *Computerworld*. The 6601 prints at 26,000 line/min.

"AT&T plans to add scope to 3B20 line" [CW, June 18], which appeared as a Softalk column, carried an incorrect byline. The article was written by Jeffery Beeler of CW's West Coast Bureau.

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NEWS

Wang predicts bright PIC future, but others skeptical

By Eric Bender
CW Staff

The competitive advantage that Wang Laboratories, Inc.'s PIC Image Processing System holds over a host of other imaging systems is its ability to offer end users the integration of images with word processing, communications and other functions, its vendor has claimed. But some experts question how much customers will pay for these added features.

"The PIC is far too elegant, except for very specific applications," said Stephen Caswell, an analyst with Trigon Systems Group in Toronto. "I wonder how many people need to double the price of the [personal computer] to get integrated text and graphics." Caswell predicted a turn toward such integration, but suggested that combining a personal computer with a standard facsimile machine is a more promising approach.

John Thibault, Wang's director of office systems product marketing, acknowledged that many office automation customers still need to be sold on the need for sophisticated image processing.

But Helayne Jones, manager for imaging systems, said, "The greatest surprise to us was how much more people wanted to do with the PIC." She noted that many early applications are in document transfer, perhaps because users initially may relate the PIC to a facsimile machine. "That's a good entree for people," Jones remarked.

Mary Ann Furniss, director of decision support for Holiday Inns, Inc.'s corporate information resources group in Memphis, said, "We immediately thought of applications for our legal department." Other uses might arise in communicating documents being revised at several locations. "The text would not be modifiable if we sent by facsimile. We don't want to reenter text." PICs also might prove useful in keeping personnel records or in security work, Jones said.

"A lot of the things we do are very visual," she noted. "You can let your imagination run with it."

However, like several other users, Jones said she has not had time to assess the system fully, and no production uses are planned yet.

Jones sees federal agencies also finding work for the PIC. "The Patent Office literally has shoeboxes full of microfiche, with pictures of every single patent application ever filed," and has been searching for appropriate imaging technology to handle its applications for years, she said.

PICs that are now being shipped feature numerous hardware and software enhancements over the version announced last fall, Jones said. The 30M-byte hard disk drive Wang announced this month is a step in the right direction, said Holiday Inns' Furniss, but "I'd rather see a 100M-byte laser disk system." Thibault agreed on the need to offer much greater storage, but said that current laser disk systems do not meet the need. "We're looking for a breakthrough," he noted.

Wang also is working to answer another request: better links between the PIC and other systems. "We plan to increase the imaging offered on all of our products and to allow for low-cost integrated workstations" for larger machines, Jones said.

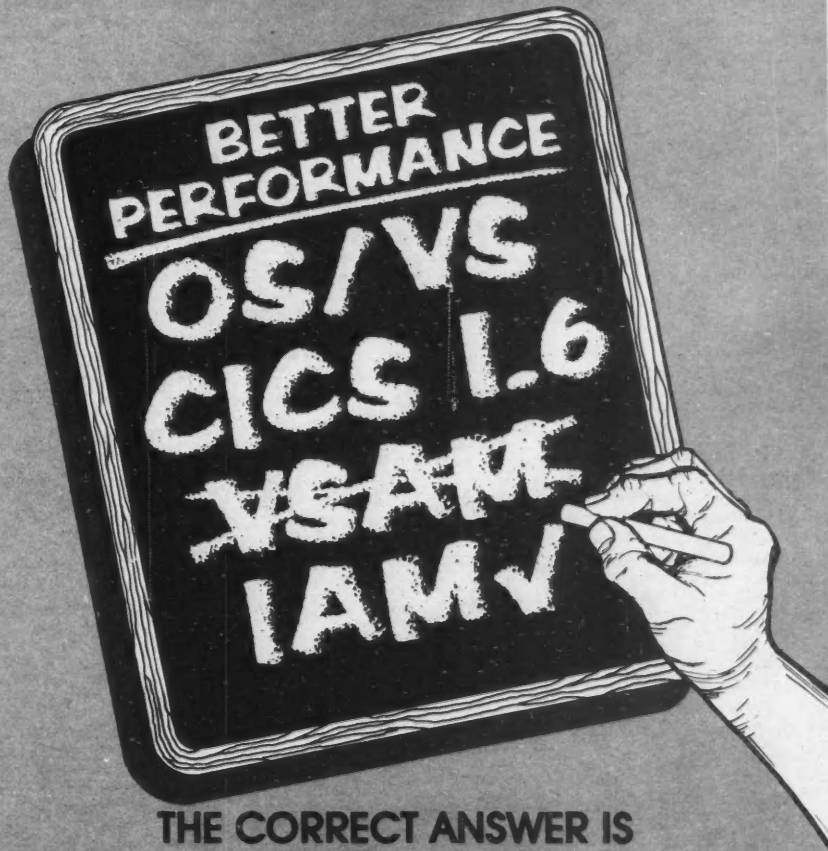
The data base forms-fill software frequently requested by early users will be announced in September and shipped by year-end, Jones said. This will tap data bases on both PICs and

larger Wang systems and permit users to generate reports through VS utilities, she added.

Wang expected to deliver about 1,000 systems between the March shipping date and the end of June, Thibault said. He predicted that something under 20,000 systems will be installed and in production at large accounts during Wang's 1985 fiscal year, which begins next month.

The Wang PIC puts together a Wang Professional Computer, image processing software, a desktop scanner, a thermal or laser printer and a high-resolution monitor. A base system with a 10M-byte hard disk drive costs \$14,965; a workstation lacking the scanner sells for \$12,115.

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Investors bid for MAI unit

NEW YORK — Management Assistance, Inc. (MAI) announced late last week it had received a proposal from an unnamed private investor group to purchase the company's worldwide Basic Four Information Systems operations for more than \$105 million in cash and deferred payments.

The acquisition, for \$30 million in cash and \$70 million in either debt with interest or preferred stock, is subject to approval by the MAI board of directors and shareholders and a favorable tax ruling. MAI said the investor group would assume the operating obligations of Basic Four and plans to continue the current U.S. and international organization while expanding worldwide operations.

The MAI board of directors rejected as inadequate other proposals to acquire separately the worldwide Basic Four and Sorbus Service divisions, an MAI spokesman said.

NEWS

Merrill Lynch breaks ground with prototyping effort

We're getting things done on time, and we know exactly what we're doing. In this business, that's an accomplishment.

— Peter Metzger,
vice-president and manager,
order processing systems

While we were designing the data base, the user was working on the prototype. By the time we got to specifications, we knew what the user wanted.

— Marilyn Hack,
project manager,
operations support

By Paul Gillin
CW Staff

NEW YORK — Those words from staff members sum up some of the results of a large-scale prototyping effort recently completed at Merrill, Lynch, Pierce, Fenner & Smith, Inc. here.

Using a new data-dictionary-based prototyping tool that automates much of the design logic, the 13-member team has nearly completed a large Cobol application project under IBM's IMS and CICS, even though none of its members previously knew Cobol, only one knew IMS and just three had CICS experience.

For the past 18 months, the large brokerage firm has used prototyping to help rewrite one of its bread-and-butter applications — an on-line order processing system that transmits customer orders to the exchange floor and makes sure they are filled correctly.

The project to write the Advanced Order Processing (AOP) system at Merrill Lynch is breaking ground where many companies still fear to tread. AOP consists of more than 50 subprograms that will process orders entered at over 1,000 terminals nationwide. The Cobol system will replace a 12-year-old patchwork of poorly documented assembler language programs that now perform

the same function, Merrill Lynch's Metzger said.

The current system runs on an IBM 3033 mainframe under IBM's aged Communication Control Appli-

cations Program operating system. Several dozen related programs have been added over the years, Metzger said. This electronic house of cards is so tenuous that a single program can bring the entire order processing system down.

AOP will exhibit none of that fragility. Running under IBM's MVS operating system, it will consist of separately developed and linked programs, allowing for easier maintenance. IBM's Telecommunications Access Method will run on both the 3033 and a separate processor so that even a system crash will not bring communications grinding to a halt.

The AOP project was started 3½ years ago using standard development procedures involving large amounts of documentation. Systems designers interviewed Merrill Lynch employees in the wire and order departments, which process exceptions (orders that cannot be matched), and found they use the bulk of the software. "The first thing we found was that the users' thinking revolved around the old system. They couldn't envision anything differently," Metzger said.

The project team developed a feasibility study, but the document turned out to be so big that no one wanted to read it, Metzger said. Then came the icebreaker. The team put to-

gether an advisability study that contained pictures of sample screens the new system would use. The photos of the screens lit a fire under the users where the paper study had not,

Metzger noted. "We thought we could take it a step further."

The project management staff decided to try an idea proposed by John Zieg, a contract systems analyst who was then doing maintenance on the old system. Zieg and colleague Bruce Martin had spent the last several years developing a prototyping tool in their spare time and wanted a chance to try it out on the mainframe. "I had nothing to lose at that point," Metzger recalled.

The tool, which is now called Prototyp/CICS and is marketed by Eureka Software Corp. of Hampton Beach, Calif., was used to develop sample screens for a presentation to a large group of users. The feedback was immediate. "I can't stress it enough: This was not something they had to read," Metzger said.

Prototyp/CICS was brought into the project in December 1982. An iterative design process has been proceeding ever since. Users can try out the screens from an on-line terminal using dummy data and then suggest

enhancements to the designers. The on-line nature of the prototype also enabled the team to bring the Chicago and West Coast users into the design picture.

Two features of Prototyp/CICS have made the tool especially effective, staff members said. It uses a procedural language to create prototypes, and it includes a data dictionary that stores all data and screen definitions and procedural logic. The logic can quickly be translated into Cobol programs. In fact, the prototype logic was similar enough to that of the production application that data base designers elected to use the same index on the production data base as had been used for the prototype.

"We looked at a lot of options," said Kelly Tuell, project manager in order match and data base development within the AOP project. "Basically, we found we could have saved ourselves a year of design effort if we had used the prototype data base design." Despite its inexperience, the development staff has completed almost all of AOP on time and within budget. The system is expected to be in production by December.

Prototyping was an ideal design vehicle for a project of this sort, Metzger said. "I would prototype any system that I couldn't describe in a specification document."

But prototyping is not always appropriate. "Most managers who work for me are computer people first and business people second," he said. "If it was the other way around and [the clients and the designers] were on the same wavelength, I probably wouldn't prototype."

Development scheme becomes learning experience for broker

NEW YORK — All your best prototyping intentions can be dashed if you are not honest with users about what the final system can and cannot do.

You should also be careful not to throw programming conventions out the window just because the prototype can be changed easily.

Those were among the lessons learned by a project team at Merrill, Lynch, Pierce, Fenner & Smith, Inc. here when they recently redesigned and rewrote a large software system using prototyping.

The design method was useful in igniting user interest in the software's potential, staff members said. However, not all of the features that were added to the prototype could be included in the production software.

One hazard of prototyping is that "you can go too far in offering users blue sky," cautioned Kelly Tuell, project manager in order match and data base development within the Advanced Order Processing project at Merrill Lynch.

Cynthia Wilson Gray, senior systems manager and assistant vice-president in order processing systems, added, "You can get caught up in a prototyping language because

of its power and forget that something can't be done in Cobol."

While there is nothing wrong with letting user imaginations run free, the final product must be a compromise, staff members said. Frequent reviews should be conducted to ensure that users know which features of the prototype are going to end up in the production system.

"I can't say it enough: Critical review is essential," Tuell said.

Developers also need to know the limits of the production environment before they start designing. "For example, do you want to be conversational or pseudo conversational?" Gray said. "A prototype will let you go either way, so you have to be aware that there is a distinction."

Gray advised that to ensure consistency, naming and programming conventions should be established before prototyping begins. A procedural approach to prototyping also helps eliminate the need to redesign.

"The idea is you don't want to use trained Cobol programmers," she said. "You want to take prototype statements and translate them into Cobol."

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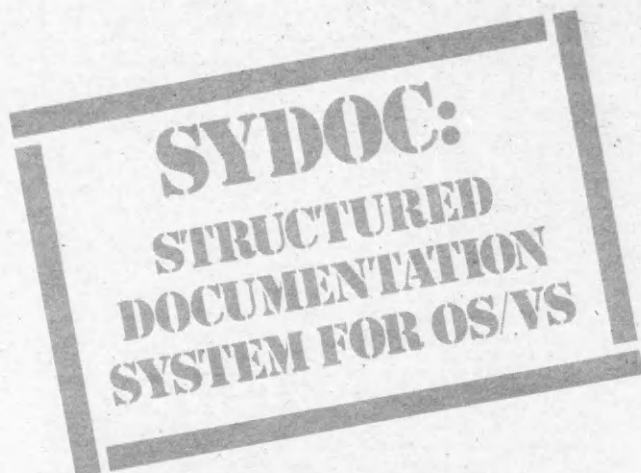
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NEWS

IBM from page 1

President Lines, Ltd. in San Mateo, Calif. "The 3270 Personal Computer will not do that."

In fact, the microcomputer does have the potential to do it, but a complicated process is required. Mike Maples, IBM product manager for 3270 workstations, said, "Once a user brings a host file to the 3270 Personal Computer, he can use a public domain program to translate the file into a Basic file so that Lotus 1-2-3 will understand the field definitions. Then he can use the import function of Lotus to bring the Basic file into Lotus."

"These steps are required because Lotus has to be told the field definitions," Maples said. "If you have a record that is 30 bytes long and consists of three fields, you have to break it apart so that Lotus knows which bytes are with which fields. This translation process is required with [Microsoft, Inc.'s] Multiplan, [Visicorp's] Visi Calc and other personal computer programs."

Crippled functions

In addition to the translation limitation, minor differences between the 3270 Personal Computer and the IBM Personal Computer cripple certain functions on some programs, the microcomputer managers said.

"Some of the device driver's requirements, specifically for the all-points addressable adapter, will require 3270 Personal Computer versions of software," noted Paul Callahan, systems analyst at the Bank of New England in Boston. "We use Focus and PC Focus. We are hoping that they will

'Once a user brings a host file to the 3270 Personal Computer, he can use a public domain program to translate the file into a Basic file.'

— Mike Maples, IBM product manager

support the 3270 Personal Computer in the future."

Some microcomputer software vendors have already adapted their programs to the 3270 Personal Computer. Among them are Lotus' 1-2-3 and Life-tree Software, Inc.'s Volkswriter Deluxe.

Metropolitan Life Insurance Co. in New York, however, is overcoming software limitations by writing its own software, according to Joe Imholz, vice-president at Metropolitan. The company has written a program that allows field office users to extract data from its Cullinet Software, Inc. IDMS data base management system running on an IBM 3033 mainframe, transfer the data to the 3270 Personal Computer and load it into various microcomputer applications, including 1-2-3 and proprietary packages. Currently, 25 microcomputers are in use at Metropolitan. Imholz estimated that 150 microcomputers will be installed at 40 branch offices this fall.

File translation is not the microcomputer ad-

ministrators' only concern, however. Attaching the 3270 Personal Computer to an IBM 3270 series controller unit could require significant expense and time.

"To run the machine, we had to upgrade our controllers, which was something that we had not anticipated," said American President Lines' Selmer. "One can take a 3278 Model 2 terminal, replace it with a 3270 Personal Computer and, without modification, run one mainframe session. Since we wanted to run more than one mainframe session, we had to enhance the control unit to support multisession terminals."

Once the unit is upgraded, the question of controller performance degradation arises. "Performance questions occur when handling file transfers," Maples said. "The 3270 normally transmits a 1,200M-byte record every 15 to 30 seconds. During file communication, you will be sending several thousand-byte records each second, and all of it passes through the 3274."

Users indicated that they are generally satisfied with the transmission speed of the 3270 Personal Computer. "IBM's file transfer facility seems to work quickly and as advertised," Callahan said.

The 3270 Personal Computer, in addition to presenting technical challenges, also has presented its users with a number of managerial questions. "You have to coordinate work on this machine with a number of people, network control facility, technical support, a CICS administrator and a manager familiar with microcomputers," Callahan said. "It is much different [from] just installing a 3278 terminal."

MARKET from page 1

distinction between domestic and international message carriers, a distinction eliminated when the Federal Communications Commission issued the Record Carrier Competition Act

in 1981.

Until then, the five IRCs — including FTC; TRT Telecommunications Corp. in Washington, D.C.; and three New York-based carriers: MCI/Western Union International, ITT World Communications, Inc. and RCA Glob-

al Communications, Inc. — provided international services from designated gateway cities. The user could choose among the international carriers, but would typically have to use Western Union to get the message to that carrier.

When the Record Carrier Act was issued, however, IRCs were allowed to enter the domestic market, and the international door was opened to Western Union, the near-monopolist of the domestic market,

Ironed out differences

The same ruling also required the international carriers to provide interconnection services to each other. In effect, this ironed out the differences in area of coverage and enabled even the smaller IRCs to reach all the countries served by the larger carriers.

The ruling also sparked a carrier price war that has, to some degree, given way to competition in the manner in which traffic is handled, including special message handling features and customized billing.

But perhaps the most profound effect of the FCC's ruling originated in the clause that allows Western Union to offer international services. Western Union entered the market in mid-1982 with the advantage of already having a large base of domestic customers — estimated by some to be four times the combined base of all the other IRC subscribers.

As evidence of Western Union's clout, a company spokesman estimated that Western Union already generates 20% of all outbound international telex traffic and 10% of the inbound traffic — a generous percentage, considering the fact that it did not enter the market until August 1982. Fifteen percent of the company's total telex revenues come from international services, according to Janet Boudris, assistant vice-president of Western Union's office message services.

"Obviously, as Western Union has gone into the international market, it has taken its traffic off the IRC networks," noted Richard Kozak, vice-

president of finance and administration at TRT. This has forced the IRCs to reduce their dependency on Western Union and build their own domestic customer base.


"It was the strategic objective of TRT to shift as much of its [domestic] traffic as possible off the Western Union network," Kozak said. "Back in 1979-80, as much as 70% of our international traffic came from the Western Union network. Today, we derive about 10% from Western Union."

To cover all its bases, TRT entered into a contract with Western Union wherein that carrier has agreed to deliver 50 million minutes of outbound traffic to TRT over a five-year period. Western Union agreed to this contract at a time when it was uncertain if it would be allowed to offer overseas services.

Two years of that contract will have passed in September, and Western Union has only come through with less than 10% of the total traffic, Kozak said.

Other carriers have seen the writing on the wall. In its effort to prepare for increased competition with Western Union, FTC recently announced that it would provide the interconnection of its domestic telex subscribers through Tymshare, Inc.'s Tymnet packet-switched network. Tymshare bought 80% of FTC in 1982, when the FCC ruled that the company could not be more than 20% owned by foreign interests. (More recently, McDonnell Douglas Corp. purchased Tymshare.)

For FTC, lessening its dependency on Western Union by establishing domestic distribution facilities has paved the way for new service offerings. According to Russ Borgmann, FTC's vice-president of marketing, supporting domestic customers with Tymnet will eventually enable FTC customers to "use their Ascii machines to talk to telex machines overseas in real time, conversationally." The Ascii terminal replaces the telex machine in the U.S., and Tymnet provides the necessary Ascii-to-Baudot code conversion.



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NEWS

Bank of America launches \$200 million worldwide link

Futuristic project aimed at reducing costs, increasing availability of customer service

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — It is 5 p.m. Greenwich Mean Time. You are assistant treasurer for one of the world's largest banks, and you are on your way from Basel, Switzerland, to an important financial meeting in New York.

As you fly across the Atlantic Ocean, you open up your lap-size personal computer, key in a few encrypted code names and, with the help of an in-house simulation model, begin transferring assets from European subsidiary banks to your company's world headquarters on the West Coast — all in real time.

Far-fetched, you say? Maybe in 1984, but if current developments at Bankamerica Corp. succeed, such a scenario could become a reality by the end of this decade, according to Jay Cook, senior vice-president, global systems services, at the bank.

In a worldwide investment, esti-

Apart from the developments in Europe and Asia, other IBS centers are expected to be set up in Miami (to serve the bank's Latin America customers), in San Francisco and perhaps in New York (to serve North America).

At the heart of the new system will be IBM 3083 mainframes, with each regional data center running at least two mainframes — one for daily operations in an on-line environment and running under the IBM MVS/IMS operating system, the other for batch processing operations, such as over-

night transactions, using IBM's VM as the operating system — linked to IBM 3178, 3278 and 3279 dumb terminals.

With an estimated 5 million lines of code, application development tools will be much in use in IBS, the chief of which are IMS/VS and Application Development Facility, both from IBM. In addition, the bank will use its own Cobol-based Microstar software package for such applications as file transfer, data base management, spreadsheet interface and terminal emulation.



Cook

For telecommunications links, the bank plans to use Digital Equipment Corp. VAX-11/750 minicomputers and its in-house developed Bofanet system, a private packet-switched network based on X.25 protocols, Cook said.

"From a technological standpoint, IBS is not a high-risk system, since it is applying already existing technology," Cook said.

"What makes this venture high-risk is its magnitude, because, to our knowledge, very few companies have implemented a worldwide migration toward common systems," Cook asserted.

'We recognized that it was getting incredibly unwieldy to pull together information from all over the world...'

— Jay Cook, senior vice-president, global systems services, Bankamerica Corp.

mated at more than \$200 million, the bank has launched its new International Banking System (IBS), designed to link up the bank's 100 offices and corporate branches in Europe, North America, Latin America and Asia.

"We recognized that it was getting incredibly unwieldy to pull together information from all over the world and that we needed something that would capture data at the point of transaction," Cook recalled in a recent interview here.

"We decided that to reduce operating costs and make our customer services more widely available, we had to change our technical environment from a series of stand-alone systems to a common data base system, and so IBS was born."

Using a design team of business, product and technical staff, the first part of the new system was successfully completed earlier this year at the team's European data center in London, after a year of development.

Two new data centers

In a critical extension of the project, the bank has now announced the building of two new data centers in Hong Kong and Singapore, worth more than \$90 million, to serve the rapidly growing Asian region.

According to bank officials, the new centers, due to be completed early next year, will be used to automate foreign exchange and money trading, the movement of funds, correspondent banking services and general ledger and customer accounting.



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NEWS

Retailer tackles six-year backlog with micro strategy

By Robert Batt
CW West Coast Bureau

CLEVELAND — What do you do when you have a six-year backlog of important applications waiting to be placed on your host computer, and you don't have the resources to accommodate them?

Faced with that question, MIS professionals at the Higbee Co., an independent department store based here, have installed what they term a "parallel data processing system."

Using Burroughs Corp. B20 microcomputers tied to a common data base via a Burroughs B1955 entry-level mainframe, the \$250,000 system allows the firm's 11 branch stores to implement such applications as electronic mail, credit collection, advertising scheduling and word processing without tying up Higbee's IBM 4341 central processor.

Patrick McIntyre, vice-president of MIS, explained: "When we drew up our five-year plan for MIS, we separated applications into two groups — those that immediately affect our assets, such as inventory control and merchandise planning, and those that are less immediate but still important, such as administrative or customer service applications."

In the latter category, McIntyre and his col-

leagues identified about 200 applications. The problem was that the 4341 mainframe was already at its capacity implementing mainstream applications.

As Charles Brown, Higbee's vice-president, put it: "While there were many applications that we could put on-line and which we could justify in terms of cost savings, we recognized that we neither had the time, the capacity, the systems nor the people to do that on our existing mainframe."

In an attempt to escape this bottleneck, Brown and McIntyre hit on the idea of a second "parallel" system containing a network of shared workstations that could also act as stand-alone equipment where required. In this way, they reasoned, the MIS department could retain control over the integrity of vital data while allowing individual stores to develop their own applications.

McIntyre began to look at equipment from several manufacturers, including Digital Equipment Corp., Wang Laboratories, Inc., NCR Corp., IBM, Sperry Corp. and Burroughs.

"In the end, it came down to a decision between Burroughs and IBM. I felt Burroughs offered better support facilities and had products that were more suited to a retail environment than IBM's," the MIS

executive said.

Beginning in June 1983, a B20 micro was installed at each branch store and linked to the newly acquired B1955 processor via a multiplex communications line running from the stores to company headquarters.

The B1955 is a 1M-byte machine containing fixed and removable disks, a systems printer and one tape drive. As part of the package, Burroughs also installed its Logic Information Network Compiler (Linc) applications generator.

"Linc is important to us because it generates Cobol code that enables us to prototype applications quickly. This allows us to manage an on-line data base environment without using up a lot of our programmer resources," McIntyre asserted.

The system is designed to be used by store managers, operations managers and executive assistants. By November, the first application — an on-line credit collection system — was up and running. Within nine months, a pilot project for electronic mail had begun, a system for scheduling sales department personnel was installed, a stand-alone word processing system was placed on-line and the company's bridal registry system was automated.

Michigan judge orders bank to pay ATM customer damages

By James Connolly
CW Staff

WESTLAND, Mich. — Dixie Elam's persistence in claiming that she was not to blame for her overdrawn checking account led a judge here to award her \$4,600 last week because her bank had relied on computers more than it had relied on people.

The Livonia, Mich., woman went to court to fight the National Bank of Detroit's claim that she withdrew \$1,110 through an automated teller machine (ATM). Elam, a customer of the bank for 30 years, maintained that she never made the one \$10 and 11 \$100 withdrawals, saying the bank made a mistake and sued the bank.

'What it boiled down to was the human element against the machine. The evidence showed that the machine was fallible.'

— Atty. J. Michael Smith

In the end, 18th District Court Judge Benjamin Stanczyk not only awarded Elam the original \$1,110, but to Elam's surprise, tripled the damages and added interest, court fees, bounced check fees and legal fees for a total of \$4,644.10.

"It wasn't just the money — I could afford to lose the \$1,100 and even the legal fees more than other people could. It was mainly because

of the bank's attitude that I did it," Elam explained after the verdict. "They wouldn't discuss anything with me other than to flatly tell me that it was my card that was used to withdraw the money. They wouldn't listen to my thoughts on it or investigate my case."

Elam's attorney, J. Michael Smith, added, "What it boiled down to was the human element against the ma-

chine. The evidence showed that the machine was fallible." He quoted the judge as saying, "We should be thankful that human beings are still around."

The judge ruled that under the Electronic Funds Transfer Act of 1978, the bank had the burden of proving that Elam had withdrawn the \$1,110 and had failed to conduct a good-faith investigation into her claim.

Bank spokesman Thomas Oren declined comment on the case, other than to say that the bank is undecided about appealing the verdict.

Elam's troubles began on January 12, 1983, when the bank notified her that her checking account was depleted. She discovered 12 withdrawals from her account in the previous five weeks and denied making them.

According to Smith, the bank's investigation of Elam's fraudulent withdrawal claim involved only a reading of the magnetic strip on the back of her card to determine how many withdrawals she had made since it was issued.

The bank decided that reading belied Elam's claim.

Elam sued in small claims court, but the case was transferred to district court at the bank's request, although the most money she could have recovered in small claims court was \$600.

In testimony last week, Elam, her husband and her son, who knew Elam's personal identification number, denied making the withdrawals. Testifying as an expert witness, computer security consultant Jack Bologna told the judge that errors in ATM systems are a possibility.

Bank officials countered that their system was infallible, but conceded that one transaction record for Elam's account was missing.

Smith argued that the missing record and Bologna's testimony were enough to cast doubt on the system's infallibility and that the bank's investigation was insufficient because the investigators didn't even test the ATM equipment.

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NEWS

Cable net to help Democrats connect at convention

By James Connolly
CW Staff

SAN FRANCISCO — The equivalent of a small city — a city of politicians, political hangers-on, reporters and technicians — will set up camp here next month and test this city's communications capabilities.

The delegates, news media and others attending the five-day Democratic National Convention will require far more than telephones in their hotel rooms. Press galleries, temporary offices and the floor at the Moscone Convention Center will be

jammed with telephones, video equipment and computer terminals linking Democratic officials and the news media with each other, their hotels and their home offices.

The assignment for building the necessary communications network is being handled by Pacific Bell Telephone Co. It's an assignment that means laying 600 miles of fiber-optic cable and 3,858 miles of copper cable, most of which will be removed immediately after the convention.

Pacific Bell, the project integrator working in joint



Preparing cables to be used in Democratic convention's net.

ventures with several other communications companies, is installing 2,700 single business lines, 3,150 Centrex lines, 1,000 private lines, 100 video circuits and 550 audio circuits. The company is carrying out the project while handling what spokeswoman Catherine Moss called a superhuman effort to build a communications network in the 4,500-sq-mile area in Southern California that will host the Summer Olympics later in July.

Double challenge

The project coordinator for the Democratic Convention effort noted that — Summer Olympics considerations aside — Pacific Bell faces a double challenge in San Francisco.

The first challenge is that Pacific Bell must complete the San Francisco project without the support of AT&T, noted John G. Harrison, project coordinator. The second challenge involves wiring an old city such as San Francisco.

"The project is serving as a model for the way in which we can expand and extend our imaginations and our services. Not only is this a massive project in its right, but it becomes all the more significant when we find ourselves conducting business in an environment that is new to us," Harrison said.

It is one of the first joint ventures that allows Pacific Bell to serve as the integrator for telecommunications services. Its partners in the joint venture are the Grass Valley Group, a Grass Valley, Calif.-based development and manufacturing firm that specializes in video transmission equipment, and GTE Corp., which is supplying the telephone sets.

In addition to the telephone sets, the system must accommodate the terminals that many of the 10,000 credentialed news reporters will use to transmit their stories as well as terminals allowing television network news crews to exchange information with their production facilities.

More than half the installed lines will service Moscone Center, while others will service some of the 144 convention hotels.

In some cases, Pacific Bell workers have had to rip up streets and walls to install cable, even taking advantage of the recent San Francisco cable car renovations to run cable through existing excavations, Moss noted.

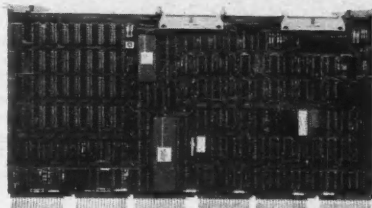
"The age of the city alone creates problems. The streets are old, so many buildings are old. We're wedging cables and wires into cramped and congested places already difficult to access," Harrison said.

Much of the copper cable will be removed after the

convention. But most of the fiber-optic material will remain, to be used for future video and data transmissions.

The special construction costs are expected to total \$2.9 million, some of which will be recovered through the resale of equipment or its reuse as part of the city's permanent system. The total convention cost for Pacific Bell is \$5 million, which will be recouped through special tariffs on those using the convention facilities, according to Moss.

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NEWS



WASHINGTON UPDATE

Mitch Belts
CW Washington Bureau

Congress to determine fate of ICST this summer

WASHINGTON, D.C. — Congress is likely later this summer to reject budget cuts proposed by the Reagan administration for the National Bureau of Standards' Institute for Computer Sciences and Technology (ICST). Instead, congressional aides predicted recently, it will approve the institute's usual budget of \$10 million for fiscal 1985.

The fate of the ICST's domestic computer and telecommunications

standards activities will be decided this summer by a House-Senate conference committee, which must reconcile the difference between the House-passed budget of \$10 million and the Senate-passed budget of \$5 million.

The Senate approved the budget cut sought by the Reagan administration in hopes of transferring the ICST's domestic standards work to the private sector in order to demonstrate support for reduced federal spending.

However, the Senate is likely to back down in the conference committee, according to the congressional aides.

In March, a panel of DP users testified that the budget cut would so cripple the institute that it would be better to disband it completely [CW, March 12].

House members request computer security study

WASHINGTON, D.C. — Reps. Dan Glickman (D-Kan.) and William Carney (R-N.Y.), key members of the House of Representatives' Committee on Science and Technology, have urged President Reagan to create a national commission to study computer security and privacy issues.

"Unfortunately, the breadth and multijurisdictional character of these issues prevent any single agency or congressional committee from dealing comprehensively with them," the two congressmen said in a letter to the president. Referring to such issues as computer crime, the vulnerability of critical computer-based national services and privacy concerns, they called for a national commission

to develop a "comprehensive framework to guide future actions by the government and the private sector."

The letter followed a recommendation by the committee's Subcommittee on Transportation, Aviation and Materials for such a commission [CW, April 16].

Telex to buy Raytheon Data Systems

By David Olmos
CW Staff

NORWOOD, Mass. — Telex Corp. said last week it has agreed in principle to acquire most of the assets of Raytheon Co.'s Data Systems Division for more than \$200 million.

Last month, Raytheon announced it was terminating its commercial terminal and equipment division based here [CW, May 28]. It cited a lack of profitability as well as delays in deliveries of Convergent Technologies, Inc. workstations, which were to be the basis of Raytheon's new Signature 8200 office system.

Telex, based in Tulsa, Okla., manufactures VDTs compatible with IBM's 3270 terminal and has been a competitor of Raytheon's in that market. Raytheon was once the largest supplier of IBM 3270-type terminals, particularly to the airline industry, but has seen its market share drop sharply in recent years.

A. Newell Garden, a Raytheon spokesman, said the agreement "will not make a significant difference to us financially," explaining that the company will lose a \$95 million after-tax write-off it would have received from discontinued operations.

In a prepared statement, Telex Chairman S.J. Jatrass said, "For some time, we have had considerable interest in the airline and commercial data terminal and communications markets served by Raytheon Data Systems. We are looking forward to building on the excellent reputation of Raytheon in these markets."

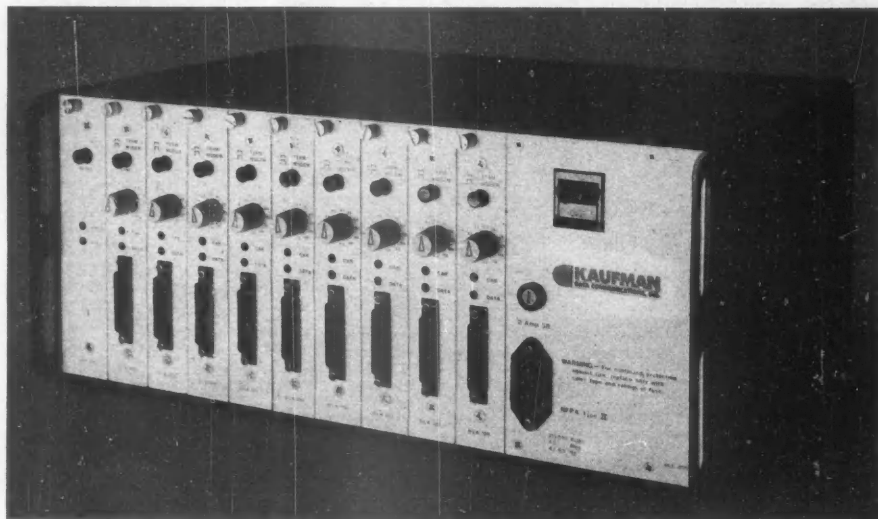
Raytheon Data Systems currently employs 3,600 people worldwide. Telex said about 2,100 employees of Data Systems and Raytheon Data Services and Leasing Co., a group formed in May, will be retained by Telex. Of the 1,500 other employees, a portion will be absorbed by Raytheon's other operations, and the rest will lose their jobs.

"It will make a significant difference to our customers to have a continuing company run the support systems for them," Garden said. "And we hope it will provide better opportunities for more of our employees."

Garden said Raytheon had "a lot of expressions of interest" in the Data Systems group, "but from companies that just wanted to pick up a few pieces."

Raytheon's Data Systems contributed only about 5% to Raytheon's total revenues in 1983 and sustained a loss of about \$23 million on revenues of \$307 million. The division lost \$6.2 million during the first four months of this year.

The companies said the sale is not definitive and still must be approved by the respective boards of directors and government agencies.



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NEWS

FCC wrestling with issue of protocol conversion

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Should the divested Bell operating companies be allowed to perform end-to-end protocol conversion, thus enabling them to introduce reduced-rate packetized data transmission services to users of asynchronous terminals?

That is an immediate question confronting the Federal Communications Commission, according to three

knowledgeable observers who spoke here recently at a conference titled "The New Telephone Companies," sponsored by "FCC Week," a communications industry newsletter based here, and Executive Enterprises, Inc. of New York.

FCC staff member Greg Vogt, who will help formulate the commission's final decision, made it clear that some modification of the present policy — under which

the divested Bell operating companies must obtain a waiver before they can include any protocol conversion in a tariffed transmission service — is virtually certain.

The other two speakers — James Denvir, former chief of the Justice Department's AT&T trial staff; and Gary Epstein, former chief of the FCC's Common Carrier Bureau — pointed to a difference between the FCC's policy and the AT&T antitrust settlement that could form the basis for the commission's upcoming decision.

Last November, the FCC adopted its present policy in a proceeding officially known as Docket 80-756, Vogt explained. He added that the commission, "in an overabundance of caution," decided to require waivers for internetwork protocol conversions — typically between X.25 and X.75 — even though it found these were not part of an "enhanced service" under the Second Computer Inquiry decision. (Enhanced services can be offered by the divested Bell operating companies only through separate subsidiaries, unless this requirement is waived beforehand by the FCC.)

The commission now has another opportunity to address this question, Vogt said. Several divested Bell operating companies have filed waiver petitions seeking the commission's approval to perform both internetwork and end-to-end protocol conversion directly, rather than through separate subsidiaries.

Although Vogt did not relate the commission's upcoming decision to the interests of telecommunications users,

those interests are very much involved. The divested Bell operating companies argue that if they are allowed to provide end-to-end protocol conversion directly, they will be able to offer packet network services to users of asynchronous terminals, including personal computers. These new services will allegedly be priced way below present dial-up and private line rates and below the prices now charged by current vendors of packetized services.

Epstein said FCC action on

the waiver petitions represents the first in a series of decisions — some to be taken by the commission, others by U.S. Federal District Court Judge Harold H. Greene — that will determine the former Bell operating companies' scope of activities for the next 10 to 15 years.

The next major issue, he added, is whether to let the divested operating companies get into nonlocal and noncommunications businesses, such as equipment leasing, software distribution and overseas marketing.

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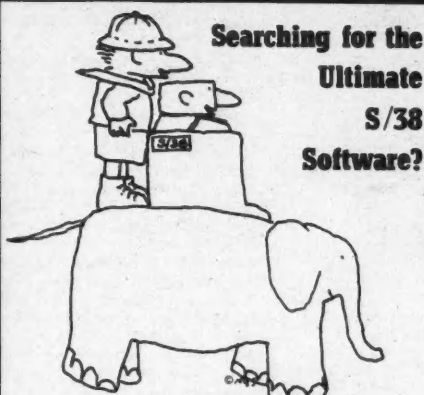
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Bill should pass House

WASHINGTON, D.C. — Congress is expected to give final approval in the next few weeks to a bill that would enable the Small Business Administration (SBA) to educate small firms about computer crime and how to prevent it.

The legislation (S. 1920), sponsored by Rep. Ron Wyden (D-Ore.) and Sen. Paul E. Tsongas (D-Mass.), authorizes the SBA to cosponsor seminars on computer security for small businesses.

The Senate unanimously approved its version of the bill on May 24, and congressional aides expect the House to ratify the Senate bill before sending it on for presidential approval.

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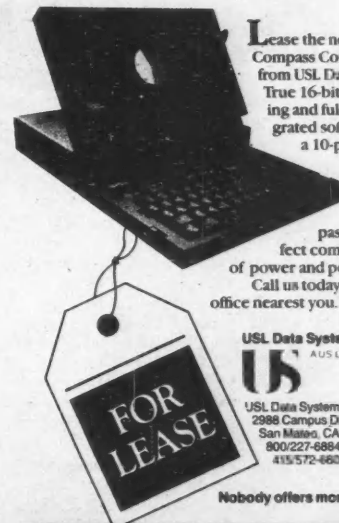
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NEWS

Speaker says banks can fend off finance field intruders

Info services, traditional bank offerings can keep retailers, others out of banks' territory

By James Connolly
CW Staff

BOSTON — Information services for customers, paired with traditional financial services, may help banks survive the intrusion of other institutions into the financial field, an executive of Marine Midland Bank said in a recent speech here.

Microcomputers carry that information and help provide those services, according to Leonard Schwartz, vice-president at the Buffalo, N.Y.-based Marine Midland, who spoke at the Bank Cash Management Users Conference, sponsored by Interactive Data Corp.

Schwartz noted that information vendors such as McDonnell Douglas Automation Co., General Electric Information Services Co. and Automatic Data Processing, Inc., along with several major retailers, have shifted into the financial services market by offering access to automated clearinghouses for electronic funds transfers.

"The only difference between these companies and banks is their inability to hold a Federal Reserve account," said Schwartz, who added that even restrictions on Fed-

eral Reserve accounts are likely to fall in the coming years. Those accounts are necessary for moving money through electronic funds transfer systems.

Schwartz noted that a large portion of a bank's business already is information management, an area whose future rests with the ability of the microcomputer to move information throughout a company. The heart of that information management is a bank's ability to tell a customer how much money he has at any given time, but micros allow the bank to go beyond



Schwartz

that point and let the customer handle his own transactions — as in home banking — and provide its customers with general investment information.

Schwartz told the cash managers that a logical step would be for regional banks to provide customers with access to an information network.

He cited the case wherein retail stores, such as Sears Roebuck & Co., want to tie in to networks that will allow them to transmit electronic orders, invoices and payments between the stores and their suppliers or customers.

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VDTs safe, Cbema tells House panel

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The Computer and Business Equipment Manufacturers Association (Cbema) said in recent testimony before the House Subcommittee on Health and Safety that VDTs "are among the safest devices in the workplace today," but acknowledged that many workers have a profound fear of the computerized office.

Cbema President Vico Henriques told the subcommittee that worker fears about VDTs causing health problems and displacing employees can be neutralized through better education of managers and users, not through government legislation or regulation.

Henriques blamed the news media for reporting sensational allegations of VDT-related health problems and for perpetuating the notion that computers replace people. He also blamed some business managers for failing to accommodate employee needs when introducing computers to the office.

To ease employee fears, Henriques said, "businesses should be educating managers to keep their expectations realistic, to provide proper training and to use computers to enhance people's jobs."

Henriques reiterated Cbema's position that VDTs do not emit harmful radiation. "There are no health and safety issues," he said. "There are comfort issues."

In the testimony, he said workers and managers have several misconceptions about the health effects of VDTs. "They may believe that visual displays cause backaches, even though the real problem is that they're not getting enough exercise. They may not be fully aware that reading at a new focal length causes some eye deficiencies to become more obvious; instead they think that visual displays cause headaches," he said.

The House subcommittee, chaired by Rep. Joseph M. Gaydos (D-Pa.), has held a series of hearings to examine labor complaints that VDTs can cause eye and back ailments and miscarriages.

NEWS

Banks urged to protect EFT systems with encryption

Security should involve series of steps, including encryption or authentication

By James Connolly
CW Staff

BOSTON — Encryption, or an authentication process using encryption, should be key elements in a bank's electronic funds transfer (EFT) system, officials of Interactive Data Corp. told attendees at the firm's recent Bank Cash Managers Users' Conference here.

But those and other computer security precautions are only as reliable as the people who hold the keys —

whether those keys are passwords or users' encryption keys — warned Interactive Data's vice-president for new technologies, Glenn Gustavson, and vice-president for TX/Microstation and TX/On-Site, Tom West.

"The user's participation is perhaps the most important part of the system," West said.

The speakers outlined

some of the positive and negative features of various network and applications security procedures.

West told the bank cash management officials that a password system is not secure unless the computer recognizes patterns of abuse, such as repeated attempts at access with improper passwords,

and shuts down the system. He said another weakness is the tendency for some users to be careless with their secret passwords.

Gustavson said an answer-back system, where the computer allows access only when it calls the user at a prearranged number, is effective but expensive. A network of dedicated lines is expensive and subject to wire-tapping.

He said applications controls include transaction sequence control, where the sending and receiving devices verify that all transac-

tions were received in the proper order; and double-writing, in which the sender creates a duplicate data base to ensure prompt restart in case of an equipment failure.

Applications security can include passwords, test keys and multilevel function security, in which receipt of a message and release of funds are handled by separate officers. Gustavson noted that test keys are sometimes too predictable and that a user could penetrate multi-

level function security by creating a phony second officer.

Gustavson and West said none of the security measures is adequate on its own. They suggested either of two processes using encryption and the U.S. Bureau of Standards Data Encryption Standard (DES).

A typical funds transfer might be encrypted by inputting the transfer message and the user's key into the DES device, which may be part of the terminal or a separate device, the speakers explained. The DES device would encrypt the message for transmission.

At the recipient mainframe, an operator would input the encrypted message and the original user key from a table of keys into another DES device that feeds the mainframe.

Gustavson described the second process, an authenti-

cation process that Interactive Data is testing for use with its Funds Transfer Service for banks and their customers. The authentication process involves transmitting the funds transfer message in plain text, along with an encrypted authentication code based on the user key. The recipient compares the authentication code with a code that he

derives by using a table of keys and a DES device to detect tampering. West's and Gustavson's discussions centered on a funds transfer system based on terminals, whether in the bank or at the bank customer's site.

Focus on confidentiality
Another panel member, Anne-Marie Ely, assistant vice-president of Marine Midland Bank in Buffalo, N.Y., said that an examination of such a transfer system by her bank's auditors focused on confidentiality and risk of loss.

"Our auditing department asked, 'What if someone gets into the system with a personal computer?' and we found it would be easier for them to get a form, type it out and slip it into a pile of transfers," she said.

Comparing a terminal-based system with traditional wire transfer systems, she added, "Most of the mistakes with wires lately have not been done with terminals, but with the Telex or an employee or a consultant."

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SEC accuses Datapoint of violations

SAN ANTONIO — The Securities and Exchange Commission (SEC) last week charged Datapoint Corp. with overstating its sales by about \$22 million and profits by about \$5 million in fiscal 1981.

The SEC complaint filed in federal court here also charged Datapoint and a former vice-president, John V. Thornton, with violating several accounting and corporate disclosure regulations in misstating the company's financial status for the year ended July 31, 1981.

Datapoint consented to an order enjoining it from future violations of certain disclosure, internal controls, bookkeeping and record keeping provisions of federal securities laws. However, the company did not admit nor deny the allegations of the SEC complaint, which accused the company of filing false and misleading statements to its shareholders. The company said it consented to the judgment in order to avoid extensive commitment of time and financial resources.

The action terminated an investigation instituted by the SEC in May 1982.

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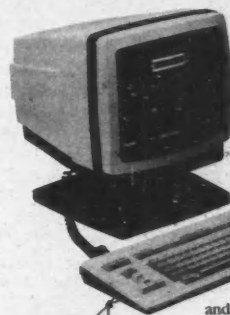
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NEWS



During a break in the race, Ostar press files reports using a Wang system.

Press charts course of Ostar boats with personal computers

By John Desmond
CW Staff

NEWPORT, R.I. — During the early and middle stages of the 17-day 1984 Observer Singlehanded Transatlantic Race (Ostar), concluded last week, reporters covering the event from their Goat Island Marina press room here relied on microcomputers instead of personal observations for reports on boat positions.

The press was using reports from a Wang Laboratories, Inc. Professional Computer to determine where the 100 racing craft were and when they would arrive at the finish line at Brenton Reef Tower. When the sail-

ors could finally be sighted by planes out of Newport, the press members returned to personal powers of observation, and the Wang micros took a backseat.

The Wang micros were receiving information from a European agency that was compiling data received by two satellites listening for signals sent out by transmitters aboard each of the 100 boats in the Ostar. It took two to three hours for the signals from the boats to reach their final destination.

The micros were generating five printed files of 168 characters in width and one display file for viewing on the monitor. The printed files yielded the positions of the boats racing, the boats not located, the positions of boats returning to shore, the boats that had arrived and the performance of the top 20 boats. The display file also listed the position of all the boats and their estimated time of arrival.

The two satellites receiving the signals were launched by Argos, a France-U.S. cooperative involved in worldwide environmental data collection.

The agencies cooperating in Argos are the U.S. National Aeronautics and Space Administration the National Oceanic and Atmospheric Administration (Noaa) and the French Centre National D'Etudes Spatiales (Cnes). Wang France and Wang UK were involved in receiving and transmitting signals as well.

The Argos Noaa-7 and Noaa-8 satellites, launched in October 1978, circle the earth in orbits of 521 to 546 miles high. Each completes its North-to-South-Pole revolution in 101 minutes, tracking transmitters within a 3,140-mile diameter.

Decoded signals

The signals from Ostar boats were decoded, stored in magnetic recorders on the satellites, then transferred to one of three earth stations: Gilmore Creek in Alaska, Wallops Island off the Virginia coast or Lannion in France.

From there, the data was sent to the National Environmental Satellite Data and Information Service at Suitland, Md., where information pertaining to the Ostar boats was separated from other data. The Ostar data was then sent to Cnes in Toulouse, France, where it was processed. From there, the data went to the Europe/1 center in Paris, where it was interpolated for correct position fixes received at different times. Finally, it was sent out to the Wang micros via an asynchronous communications package offered by Tymnet, Inc.'s data communications service.

Three reports were prepared daily and sent to Wang micros in London and Plymouth, England and in Newport, R.I., where the finish line was located. A Wang Professional Computer Model 005, with a 512K-byte memory, configured with a 10M-byte disk drive, 1,200 bit/sec modem and a 160 char./sec PC-PM016 printer, was receiving information in Newport. The press office was also equipped with Wang's World Language software, which operates in French, German, Italian, Dutch, English and Spanish.

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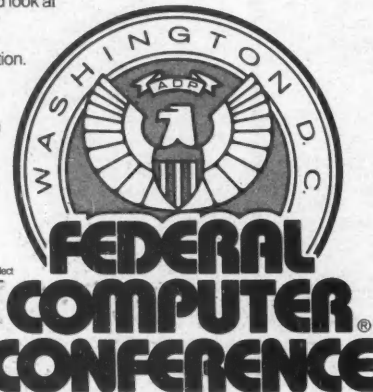
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NEWS

Managers point out obstacles to micro implementation



CW AT
MICROFORUM '84

By Edward Warner
CW Staff

NEW YORK — What's the biggest hurdle to overcome in incorporating the microcomputer into a corporate office environment? That question, put to several computer managers attending the Microcomputer Managers Association's recent Microforum '84 here, elicited a variety of responses, few of them the same.

Only two of the people interviewed by *Computerworld* at the conference had the same complaint. They said their biggest difficulty was wading through the flood of new products coming on the market.

"There's an explosion of products, both hardware and software," said Gene Maimin, who oversees a fleet of 51 IBM Personal Computers and Per-

sonal Computer XT's as project manager for microcomputer support for the New York office of Columbia Pictures. Maimin was echoed by Susan Zetscha, an internal microcomputer consultant for Metropolitan Life Insurance Co. of New York, who said, "You're playing catch-up [with the flood of new products]. You really can't control it."

Other users offered a variety of reasons why incorporating the microcomputer into their organizations is difficult. For Ronald Li, systems manager for the Montefiore Medical Center in Bronx, N.Y., the magic word is "communications." He wanted to secure the proper network because "the users group is demanding data from the host."

For Jean Chan of Morgan Guaranty Trust, a New York bank, the magic word is "security." She wanted to know how she could be sure the bank's micro files were secure.

For others, the concerns were more complex. William P. Lull, who

operates a consulting firm in microcomputing, said his hurdles are twofold. The first is how to provide training that lets users think of the microcomputer as a tool for which they can determine their own applications. The second and thornier hurdle, he said, is how to impart this knowledge to older decision makers in a corporation.

Such employees, he noted, are apt to look on the microcomputer as "a word processing thing or something. This reduces its value to them." Lull said such executives are usually the major decision makers in a corporation and that asking them to attend a seminar or two will not work because it will force them into "admitting that they don't know this new technology."

Steven Machlis, whose responsibilities as a microcomputer consultant with Goldman, Sachs & Co. of New York include aiding the users of his firm's roughly 30 IBM Personal Computers, said Goldman Sachs' DP

department is becoming a stumbling block to the spread of microcomputing. "Nobody wants to promote [the micro]," he said. "There are [already] too many machines out there."

A similar difficulty regarding the DP department, or at least other departments' attitudes toward DP, is a problem in the state of New Jersey's administrative departments, according to Bruce Rosser, bureau chief in the technical services department of the New Jersey Department of Transportation. Rosser said, "The greatest stumbling block [to integrating the microcomputer] is the hatred people feel for DP. They can't stand us, and we think they're a bunch of dummies."

As a result, "creative purchase orders" are sometimes written by other state departments to acquire microcomputers, some of which cannot be networked with the rest of those owned by the state. And, Rosser added, "Once they have them, they don't want to talk to us."

Speaker urges broader role for micros in corporate arena



CW AT
MICROFORUM '84

By Edward Warner
CW Staff

NEW YORK — Consultant

and MIT professor Dr. Michael Hammer challenged a group of approximately 120 microcomputer managers here this month to stop using the microcomputer for nothing more than word processing and spreadsheets and to use it instead to transform

their businesses.

For an example of how microcomputers can transform a business, Hammer pointed to the McKesson Corp. of California, which used the power of personal computers to change from being simply a drug distributor to "the largest processor of [pharmaceutical] insurance claims in the country."

That transformation occurred because McKesson was able to see ways in which the microcomputer could be used for something more than automating in-house tasks such as order entry or word processing, according to Hammer.

It leased personal computers to its pharmacist customers throughout California so the druggists could order products directly from McKesson and, if they wished, transmit to McKesson the data on insurance claim forms.

The claim forms had been flooding the pharmacists' offices, and when McKesson took them off the druggists' hands for a 5% commission on each claim, the company widened its scope and profits.

Such feats as McKesson's are now possible for most businesses; the cost of processing power is no longer a roadblock to their happening, Hammer said, owner of the Cambridge, Mass., consulting firm Hammer & Co., who made his remarks at the opening of Microforum '84, the national conference of the Microcomputer Managers Association. "Within a year," he predicted, "You're

going to be able to put an [IBM 370/158] on a desk in terms of processing power."

The real roadblock to making the transformational step in a firm is an attitudinal one, he argued. "The age of expensive and complex computing is gone and ain't never comin' back. [But] we haven't changed."

Instead, most computer professionals still think about personal computers in mainframe terms, and the applications that those machines take on

are traditional office automation tasks.

Even if a firm feels unsure about undertaking a McKesson-style business transformation, Hammer said, the microcomputer should at least be employed to make what he called functional enhancements in the firm's way of doing business. Such an enhancement, he explained, would be one where the microcomputer would be used to help a company "buy smarter" by putting into its data base all the data from the firm's purchasing department.



CW photo by E. Warner

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NEWS

Micro vendors told to increase, upgrade support



CW AT
MICROFORUM '84

By Edward Warner
CW Staff

NEW YORK — Ask the microcomputer manager — that new breed of specialist integrating the personal computer into a corporation — what he wants from hardware and software vendors, and he is likely to respond, "Better communication."

That was the assessment of a panel of six microcomputer managers, all from Fortune 500 firms, who spoke out in a presentation at Microforum

'84, a conference held here this month by the Microcomputer Managers Association of 130 microcomputer managers.

Whether it be via better manuals, better user training or, as one microcomputer manager suggested, via a toll-free help line, the panelists declared their need for more information about the microcomputer products they buy.

Short on specifics

Even product advertising was knocked by one panelist as too short on specifics. That panelist urged that each advertisement be accompanied by a toll-free number that interested readers could call for more details.

It was product documentation, though, that took the greatest number of knocks from the panelists. Ion Amariuta, national DP manager for Coopers & Lybrand accountants, charged that 35% of all his department's manuals have errors regarding the products. That, he said, can spell trouble for an office where the network of personal computers and peripherals is constantly being reconfigured.

Marcia Hearst, information center manager for Metropolitan Life Insurance Co., meanwhile, knocked the continual listing of changes made by vendors in documentation, saying, "I don't want my users to wade through three books of changes." All manuals

should state the resource requirements of the software, provide step-by-step installation instructions and have a complete index, she said, noting that only one manual she ever encountered showed users how to load a diskette.

Another panelist, Bud McKennon, director of finance and administration for the NBC television network, called on vendors to supply more manuals with each microcomputer because of the greater number of users in an office than in a home.

McKennon, who, until his recent promotion, was responsible for managing NBC's 13 New York office microcomputers, said vendors should provide a toll-free number with their products and bundle the price of that service into their charges.

Better training and support

Several of the panelists also called for better training and support from vendors. "Training and support has got to be the key reason I would support your [software] in my organization," Virginia Talamo of Price Waterhouse & Co. in New York told vendors. An area of training that she said is often neglected by vendors is that of "training for the trainer" — the person who will actually teach the organization's users. Providing those people with instructor's manuals would be of particular help, she observed.

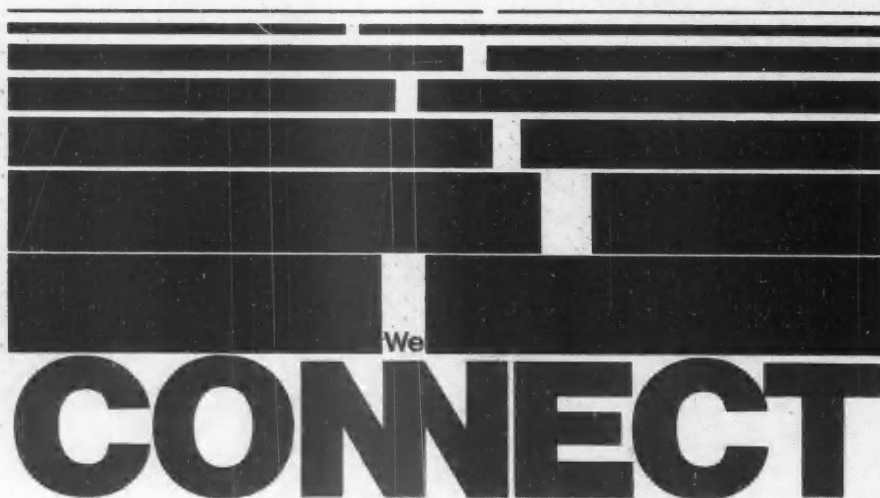
Talamo also called for on-line tutorials containing specific modules directed toward the user's industry. "My executives," she said, "don't want to see the ice cream shop [used as an example] in their tutorials. They think it's infantile."

As for the products themselves, panelist Hearst called for more software with the capacity to upload and download data to a mainframe and that can share data with other programs. "We've almost decided to stop supporting a product because there was no migration path upwards," she noted.

McKennon, meanwhile, urged the spread of multiuser systems, noting that six of NBC's New York microcomputers were configured in multiuser systems that provided access from 48 workstations. Buying a personal computer for each worker's desktop "costs too much," McKennon said. Besides, each office is better served by having its data base centrally stored on the office multiuser microcomputer.

Dennis Rodriguez, systems manager in the office automation department of Merrill Lynch, Pierce, Fenner & Smith, Inc., meanwhile, called on vendors to "take your cue from the mainframe manufacturers" and provide a one-time licensing charge for use of a program, rather than selling each diskette separately. It was Rodriguez who suggested a toll-free number to give specifics on advertised products.

Panelist Hannah Blank, vice-president of Chase Manhattan Bank, advised vendors to get to know the means by which each of their clients is integrating the micro and then direct their pitches to the proper individuals in each scheme. Some corporations, Blank explained, have microcomputer managers, others "have scores of users doing their own thing."



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NEWS

The best way to reduce stress? Good management



By Dr. Paul E. Greenfield
And Larry Raskin
Last article in a three-part series.

In the fast-paced, highly competitive computer industry, excessive stress can sharply reduce individual and organizational performance. In our first two articles, we identified six categories for assessing work-related stress: ambiguity, conflict, overload, change, responsibility and physical environment.

We also described the messages that signify excessive stress levels. These include organizational messages, such as high turnover and absenteeism; interpersonal messages, such as argumentativeness or withdrawal; and personal messages, such as chronic illness or depression.

Identifying stress levels is the first step toward reducing their harmful effects. "My responsibility is to manage the business," said an executive in a software company. "This also includes improving organizational health."

Studies have shown that every dollar invested in employees' physical and mental well-being saves \$3 in productivity. In fact, American business would save over \$10 billion per year if stress-related costs were reduced by half.

Many companies are paying closer attention to stress. They are finding that their employees remain loyal longer and produce more when the company promotes personal and organizational health.

The basics

The best stress reducer is good management. Employees who are poorly managed are more likely to suffer from excessive stress. In the DP shop, employees with technical abilities are often promoted to supervisory positions. Some lack the management skills to be successful in their new responsibilities.

Supervisors and managers reduce stress when they listen well, set clear expectations, appraise performance fairly, involve employees in solving problems and make sound business decisions. You can reduce stress by making sure those in responsible positions receive the coaching or training they need to be successful.

Senior managers set the tone in any organization. You can give stress reduction a higher priority in a number of ways. Put "stress" on the agenda of your next senior staff meeting. Encourage managers to spend time in MBWA — management by walking around. Have them pay attention to such stress messages as the level of interpersonal conflict and changes in employees' behavior. Collect data about turnover rates,

productivity levels, absenteeism and medical claims. Enroll yourself in a stress management workshop.

Policies, programs

Companies use a wide variety of approaches to reduce excessive stress and promote health. These include:

- Establishing flextime so that employees can adjust their hours to work when they are most productive, allowing them to manage career and family responsibilities better.

- Creating healthier work environments by looking critically at physical surroundings, changing lighting, reducing noise, maintaining a constant temperature, setting aside

quiet places and quiet times and providing healthier foods in cafeteria vending machines.

- Educating employees about stress and health by publishing articles in newsletters and distributing literature from local health care agencies; developing the personnel department as a resource.

- Providing training in stress management and time management by qualified consultants.

- Screening for high blood pressure, weight problems, stress symptoms.

- Encouraging physical exercise by teams, groups and individuals; sponsoring leagues and recreational events; providing showers and lock-

ers; contracting with health clubs for reduced membership fees.

- Developing in-house facilities, including exercise rooms, volleyball courts and so on.

- Establishing employee assistance programs for counseling in alcohol and drug abuse and for referrals for more extensive treatment.

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See **STRESS** page 24

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Greenfield and Raskin are consultants with Stress Management Consultants, Inc. in Cambridge, Mass. Greenfield is also a psychotherapist in private practice and Raskin is a senior training specialist with Automatic Data Processing, Inc. in Waltham, Mass.

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NEWS

Vendor panel addresses future trends in software

By Paul Gilin
CW Staff

CHICAGO — Will applications programming become a thing of the past? What is integration? What kinds of management changes do companies have to make to meet new data processing requirements? And just what is IBM's software strategy?

Those were some of the topical questions addressed by top executives from six major software companies during a panel discussion held here recently at the Information Management Exposition & Conference for Software (Info/Software).

Despite the diversity of companies represented, the panelists showed surprising unanimity on many topics. They generally agreed that DP has to reorient itself to face a coming explosion in end-user computing, that confusion regarding some terminology is largely the fault of the vendors themselves and that IBM is likely to assume a much more aggressive software posture in the future.

The panelists included John Landry, vice-president of research and development at McCormack & Dodge Corp.; Frank Chisholm, executive vice-president of Cullinet Software, Inc.; Bruce Coleman, president of Informatics General Corp.; Martin A. Goetz, president of Applied Data Research, Inc.; Dennis Vohs, vice-president of research and development at Management Science America, Inc.; and Thomas Nies, president of Cincom Systems, Inc.

On the future role of applications programmers, most panelists agreed that the job will not go away, but will change markedly. "The advent of query languages will reduce the need for applications to be built," Vohs said. "Today, many applications are written simply to get a piece of data out of the computer."

Emergence of a hybrid

The result of the move to end-user computing will be the emergence of a "cross-breed between a programmer and a user," Landry added. "We call them 'applications specialists,' and we see that job blossoming."

Coleman noted that due to the complexity of many applications, companies are finding it easier to change the way they do business rather than the software. "As applications become more mature, we'll see more time spent on defining the business rather than changing the software," he said.

Asked to define the term "integration," most of the panelists agreed that vendors have contributed to the confusion surrounding the word. "There are all types and levels of integration, and everybody says they have it," Chisholm said.

Nies noted wryly that vendors have kept the definition obscure as a marketing tactic. He encouraged users to create their own definitions of integration and measure vendors by those standards.

Vohs defined integrated software as having "common functions, common elements and common communications so you don't have to turn one application off to go to another." Chisholm said the key to both vertical and horizontal integration is that "one piece [of the software] is expecting the other piece to be there."

Prompted to suggest changes that

organizations should make to cope with changing DP environments, the panelists concurred that the drift is inexorably toward user computing. DP has to begin to control that change before it gets out of hand.

"In the long run, DP should control all applications," Goetz stated. If DP fails to take control, the proliferation of languages and tools in the user community will lead to "chaos," he said.

Other panelists asserted that it is becoming crucial for businesses to define their strategies better before developing a DP plan. "The business of data processing is different from the user business," Vohs said. "Users have to define their requirements to

be sure their goals are being met by DP."

While the representatives agreed that IBM is aiming to grab a piece of the software market, they differed on how traumatic that move would be. Nies maintained that "by the end of the decade, IBM will take away the data base management system [DBMS] market by putting it on a chip," probably in a forthcoming mainframe announcement.

Landry stated that IBM's DB2 DBMS "will be the production data base environment of the future" and will be tied more closely into IBM's 3270 Personal Computer for a micro-mainframe link.

But Chisholm disagreed with Nies,

claiming that microcoding of a DBMS would be a major risk for IBM. "Who'll put a million lines of code on a chip, knowing that one bug could be disastrous?" he asked. Chisholm predicted that IBM will microcode standard routines, such as I/O procedures, and leave the DBMS market essentially open.

Vohs said a stronger IBM software presence would be a benefit to independent companies and users by providing a de facto standard. "That allows us to build safely on a standard environment," he said.

However, he admitted that IBM's immense sales force could allow the computer giant to gut the low-end market.



NEWS

Micro-mainframe links a hot topic at two shows

By John Gailant
CW Staff

CHICAGO — Much has been promised of them, yet most currently available microcomputer-to-mainframe links fall far short of user expectations.

While frustrating, that situation has hardly dampened interest in the subject. Micro-mainframe links remain a hot topic, judging at least by attendance at sessions held at both the Information Management Conference & Exposition for Software (Info/Software) and Advanced Manufacturing Systems (AMS) conference held here earlier this month.

While manufacturing managers at the AMS micro-mainframe session

were being told that link technology would transform micro workstations into valuable productivity centers, Info/Software session participants were advised to take the plunge. That message came from speaker John Crocker, executive vice-president of On-Line Software International, Inc.

Crocker said management information systems professionals and end users must begin experimenting with the micro-mainframe products already offered. "The technology is still in its infancy," he said, "but don't wait around for the perfect solution. Educate yourself to what is available and try to match that technology to your present needs. In addition,

keep micro-mainframe links in mind while you are building applications."

In reviewing the state of link technology, Crocker said the variety of micro-mainframe products available fall into four basic groups. The simplest links either provide basic terminal emulation capabilities or enable simple file transfer between the micro and mainframe. More advanced products allow end users selective access to mainframe data, and the fourth class of links provides bidirectional data transmission between the systems.

Crocker noted that currently available links are also divided between those with proprietary and

open architectures. The proprietary links offer only data transfer to and from a particular vendor's micro or mainframe data base management system or applications. In contrast, the open architecture links provide for transfer between a variety of DBMS and applications.

Contrary to prevailing wisdom, Crocker said, the linking of micros to mainstream information systems is likely to increase rather than reduce mainframe processing loads. In addition, he warned, micro-mainframe links could have a serious impact on existing communications networks, which may not be designed to handle the volume of data transmission required by link users.

Crocker also said that data access security will pose a double-edged problem for MIS professionals. Micro-mainframe links increase the risk of security breach, yet overly restrictive protection systems could frustrate end users with legitimate claims on corporate data.

'The dark side'

That theme was echoed by Thom-
See MICRO page 24

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GENERAL  ELECTRIC

Missing link seen critical

By John Gailant
CW Staff

CHICAGO — The microcomputer-based workstation is poised to become manufacturing management's most important productivity tool. But a critical factor in the successful implementation of micro workstations is the linking of micro and mainframe applications.

That link, according to Dr. Scott Hamilton, manager of research and development for Comserv Corp., can transform the mainframe into an extension of the micro manufacturing application, providing access to corporate data, processing power and other applications.

Speaking during the recent Advanced Manufacturing Systems conference here, Hamilton said that nearly 40% of the companies responding to a survey conducted within Comserv's user community utilize some type of micro-to-mainframe link. Typically, fewer than 10 micros are linked to mainframes in those organizations, and none of the companies is yet utilizing the link to share data between manufacturing applications.

According to Hamilton, respondents said such a linking of micro and mainframe applications would enable them to perform a variety of important tasks on the micro workstation. Among the local functions mentioned most often were manufacturing management reporting, business planning, forecast development, spreadsheet analysis and work center scheduling.

All the applications would require downloaded, summarized
See LEASIS page 24

NEWS

MICRO from page 23

as O'Flaherty, director of software programs at Input, Inc., who said that security is a missing link in connectivity software. Offering insight into what he labeled the "dark side of micro-mainframe links," O'Flaherty said that overoptimism, based on unfulfilled promises, abounds among users and vendors.

He urged management to take a "corporate view" of

micro-mainframe link technology. A link should be adopted only if it solves business problems, he said.

In addition, a solid foundation of trust is a necessary precondition for the successful implementation of such a link. O'Flaherty said the link must be part of the organization's "optimization hierarchy," fulfilling first the requirements of the corporation and its departments and finally the personal needs of its end users.

LINKS from page 23

mainframe data that could be maintained and manipulated on the micro. In some instances, according to Hamilton, the workstation information would later be uploaded for inclusion in applications that are processed on the mainframe.

The nature of the applications to be performed at the micro workstation is the most important factor in the selection of a micro-main-

frame link, according to Hamilton. In reviewing the applications requirements, he said, a user should consider:

- Whether ad hoc query capabilities are required. — Is the downloading of predefined mainframe data sufficient, or does the application require summarized or calculated data that can only be accessed through ad hoc query capabilities?

- The volume of mainframe data to be downloaded

and uploaded. — How much data will the link package have to transmit?

- Response time. — How quickly must the data be downloaded or uploaded to the mainframe?

- The degree of data summarization needed. — To what extent will mainframe resources be utilized to summarize production data for use in the micro workstation application? The summarization of manufacturing data can often require a good deal of DP involvement.

- Uploading requirements. — Will data processed at the micro level be uploaded to the production data base? Should the link provide uploading to live production data or to some type of buffer data base?

- Data sensitivity. — Will the workstation application access sensitive data on the mainframe? If so, does the link offer security capabilities to limit access to authorized users?

STRESS from page 19

for 20 minutes. Check with a physician before undertaking any strenuous exercise. To start, take a brisk walk after work.

Nutrition. Eat a balanced diet with reduced intake of cholesterol from fatty meats, oils and dairy products; reduce salt, sugar and caffeine; eat more fresh fruits, vegetables and whole grains. Have an apple instead of a sweet roll. Substitute juice for your mid-morning cup of coffee.

Relaxation. Take several short mental health breaks during the day. Five minutes of quiet time can make you 30 minutes more productive. Stretch at your desk; try to leave work at work by sitting quietly or going for a short walk. Take your vacation this year.

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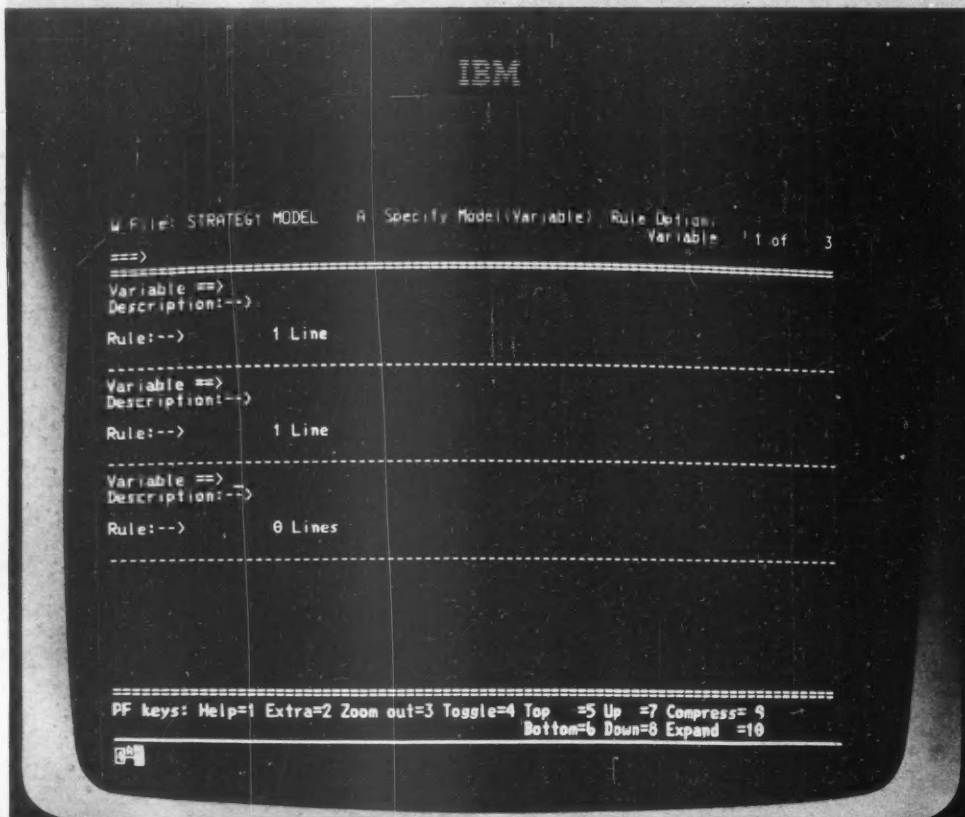
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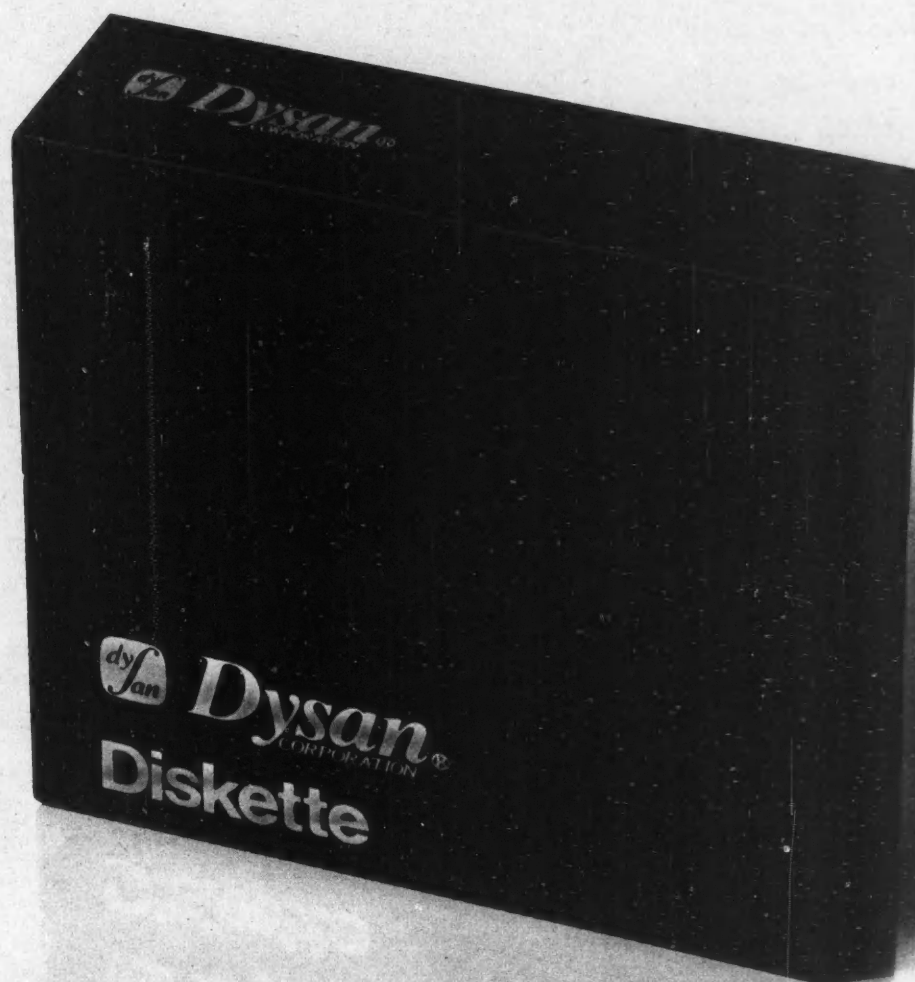
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NEWS

U.S. firms dissatisfied with federal data on resources

By Robert Batt
CW West Coast Bureau

WASHINGTON, D.C. — Corporate America's need for timely international data concerning natural resources and the environment is not being adequately met by the federal government's network of information systems, a newly published report has found.

"Corporate Use of Information Regarding Natural Resources and Environmental Quality," from the Council on Environmental Quality (CEQ), said major U.S. corporations are not satisfied with the government's computer-based natural resource forecasting and feel its information is often out-of-date.

While the government has well-maintained data bases that corporations use, it does not report as much information as many companies would like about market demand for natural resources, including demographic data, renewable energy, mineral resources and land use, the report said.

"Operating conditions are changing, and corporate information needs are evolving faster than our decentralized information network can respond. Drastically quicker release of

federal government data [is] a most pressing corporate need," the CEQ reported.

The 72-page report is based on interviews conducted with 229 information users at 45 of America's largest corporations, trade associations and private information companies. Organizations taking part in the study included American Express Co., Hewlett-Packard Co., Standard Oil Co. of California, Exxon Corp. and Boeing Co.

While the federal government is regarded as the primary source of information on international natural resources and its data critical to corporate strategic planning, market research and resource acquisition,

there is a serious question concerning the accessibility of government data to private organizations.

According to the report, one manager of information services at 3M Corp. observed, "The primary problem with locating government sources is that there is no single, reliable, comprehensive index of all government publications."

To rectify these perceived deficiencies, the CEQ recommends a number of new approaches, including the creation of an index of government resource information, the setting up of a clearinghouse for international natural resource information and the release of more timely information by making it available to interested

users in electronic form.

"Because the government's data base covers so many topics, corporate analysts rely on it. A combination of early release and electronic transfer would vastly improve the timeliness of government data. Information in prepublication electronic form, such as photocomposition tapes, offers a technological solution," the CEQ asserted.

Information contained in the data base, the report concluded, should be standardized whenever possible in order to make it comparable from one country to another. The resulting consistency will be crucial to the ultimate usefulness of the data base, it said.

Info center conference set for August

BOSTON — The Information Center Conference and Exposition, directed at planners and managers of information centers in business, industry and government, is scheduled to take place Aug. 26-30 at the Sheraton Boston Hotel and Hynes Auditorium here.

Sponsored by Warren/Weingarten, Inc. of Boston, the conference will include 60 sessions and will feature individual speakers and panel discussions, product demonstrations and more than 100 exhibits, according to the sponsor.

Two keynote speakers will address the conference. Dr. Michael Hammer, founder and president of Hammer and Co. and associate professor of computer science at MIT, will discuss "A Strategic View of Corporate Computing," concerning the blurring of the distinction between data processing and personal computing.

Dr. Larry Harris, founder and president of Artificial Intelligence Corp., will speak on "Artificial Intelligence in the Information Center," addressing whether artificial intelligence systems may reduce the need for training and how natural language software and expert systems will affect end users.

Registration for the entire conference is \$470 prior to Aug. 13 and \$520 afterwards, the conference sponsor said.

Single-day registration is also available.

More information is available from Nancy J. Weingarten, Warren/Weingarten, 38 Chauncy St., Boston, Mass. 02111.

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That software is Aura. In fact, Aura is the most adaptable software you can buy. With Aura, users can create their own menus to define entire sets of tasks. Stream jobs together to complete a series of operations with a single keystroke. And operate their IBM or similar personal computers without having to learn or remember a single command.

In short, Aura lets your end users do it themselves.

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Aura takes an approach that redefines the structure of personal computer software. Because its database provides central information storage from which graphs, word processing documents, and spreadsheets can be built.

In addition, when a field is added or changed, all files are automatically reformatted, without rekeying. Related graphs, documents, and spreadsheets are updated as new data is entered, changed or deleted.

The number of files and records are limited only by disk capacity. Aura supports records of up to 255 fields with 255 characters each. Each record can have up to eight indexes. And each index is built automatically in an advanced multiway tree structure.

3D SPREADSHEETS

Aura's 3D spreadsheets offer capabilities that aren't just innovative. They're unique.

Consider that an unlimited number of Aura's 255 row by 63 column spreadsheets can be linked together at the touch of a key. And that with Aura's ZOOM feature, a user can instantly inspect the details behind any cell of information derived from any other spreadsheets.

Spreadsheets can even be created from existing database information and then turned into graphs or charts.

FREE-FORM AND BUSINESS GRAPHICS

Aura's high resolution graphics also let end users do it themselves. In fact, they can draw their own graphics interactively or call them up ready-made from a menu.

And it's easy to design everything from organizational charts to corporate logos. Because while free-form graphics are being created, the menu remains on the screen to guide the user along.

Business graphs can be generated from information in the database, a spreadsheet or directly from the keyboard. And prepared graphs and charts can reflect figures from a given point in time or from the most current information in the database or spreadsheets.

When the graphic elements are completed, one or more of them can be automatically integrated into a single page or pages of a word processing document.

Hardware requirements are: only 256K of internal memory with either a hard disk and one double-sided, double-density floppy disk drive, or two double-sided,

NEWS


**TURNAROUND
TIME**
Larry Long

Q I am the data processing manager of a small manufacturing company. While I've worked here, we have gone from no computer to an IBM System/36. Most of the standard business systems are automated. For a number of years, we have been looking into putting computers in our six plants, but have not done so because the cost is prohibitive.

Our president and vice-president of manufacturing attended a recent trade show where they saw many computer wonders.

Shortly after returning, they invited a consultant who had worked

with us in the past to demonstrate his micro programs, which they had seen at the show.

Soon afterwards they made the decision to install [IBM Personal Computer XT]s in our plants and purchase one of the consultant's programs. The vice-president of manufacturing appointed an engineer he had just hired from his old company to install this program in the plants.

I was asked to review the consultant's other programs. I did so and recommended that we not purchase them.

They are difficult to use, too expensive and have many duplicate files that require maintenance. Moreover, they require too many changes to our operations, and there is no data security.

Against my recommendation,

management decided to go ahead and purchase the programs. They also are to be installed by the recently hired engineer.

Our personnel director tells me that I shouldn't be upset: They have a right to run their departments the way they choose.

I feel that my part of the "team" is being lopped off. What do you think?

In theory, MIS professionals want to encourage members of their user community to help themselves. Also, in theory, the user has readily available technical advice in the MIS department.

Sometimes users go too far in their pursuit of technological self-sufficiency and, sadly, ignore the advice of MIS personnel.

I cannot determine whether management made the right decisions

from the information you have provided. Maybe the positives actually outweigh these seemingly project-killing negatives. Or, perhaps, management was hypnotized by a slick demo and promises of a solution to all problems.

I am familiar with the outcome of many situations like yours. Based on these observations, I would say that the top management override of an MIS manager's well-thought-out recommendations has proven to be a mistake at least 80% of the time.

If you feel strongly that their decision is misguided, do two things. First, articulate to top management (in terms they can understand) exactly why the decision to go with the IBM XT's and the manufacturing software is wrong. Then give them at least one viable alternative.

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With Aura's word processor, it's easy to insert database, spreadsheet or graphic information into the middle of a report, letter or memo. And form letters can be automatically addressed with names on file in the database.

Words, phrases or pages can also be moved between documents. And users can edit multiple documents concurrently.

Just a sampling of Aura's word processing functions include ruler operations, search and replace, block operations, headers and footers, printer control and automatic reformatting.

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Aura's integrated elements are only the beginning of its power. Because Aura also has an applications generator in its database module that takes it a quantum leap ahead of any other personal computer software.

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TOMORROW

Aura is only the beginning of what Softrend has planned for personal computers in large corporations. Because we're already at work on new ways to help you take even better advantage of personal computers.

For more information call (603) 898-1896, or write: Softrend, 2 Manor Parkway, Salem, NH 03079. And let your end users do it themselves.



double-density floppy disk drives.

Q Like many members of the so-called "B.C. generation," I have entered the world of computers through the back door. I am employed as a college administrator and make use of computers in strategic planning. In addition, I have taught adult evening college classes in Basic programming and software applications. How does the professional MIS world view such non-specialists? Can users such as I hope to make contributions to the MIS field?

The trend in MIS is to help users help themselves. MIS professionals appreciate your contributions, but with a growing backlog and the availability of user-friendly software, they are beginning to expect users to pull their share of the load. You are doing your share but, in general, end users at all levels need to become more active participants in MIS activities, especially those that affect them directly.

Q I'm experiencing great difficulty in locating a job. My six years of operator experience have become as obsolete as the systems I work on. I rarely get to fill out an application because I don't have IBM 4300 or 30 series experience.

Also, my supervisor is bad-mouthing me. We have a great personality conflict that can't be resolved — I have tried for four miserable years. At one time we were both at the same level, but to my dismay, she was promoted to the supervisor position. Now she likes to exert power without justice and is slowly trying to work me out by cutting responsibilities and lines of communication.

Also, she threw me onto the third shift. I'm only making \$15,500. How do I get out of here?

No \$15,500 job is worth this kind of frustration. Perhaps you are not looking in the right place. Not everyone uses IBM hardware.

Experienced operators accepting employment in non-IBM shops rarely have experience on similar computer systems. I would suggest that you expand your search to non-IBM shops and smaller installations (IBM and non-IBM).

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

NEWS

Brown proposes nationwide computer education plan

By David Myers
CW New York Bureau

NEW YORK — Former Calif. Gov. Edmund G. Brown Jr. has proposed a nationwide scheme to improve computer education in the public schools, including the establishment of five regional "centers of excellence" to study the relationship between computers and human learning.

Speaking at a recent daylong forum here on the "Human Side of Personal Computing" sponsored by Hayden Publishing Co., Brown unveiled a proposal to award public schools in each of the 50 states matching grants from the federal government to set up pilot programs in computer education for all students.

Now head of the bipartisan National Commission on Industrial Innovation, Brown told reporters that increasing the skill level among the nation's students "is the key to restoring our position in the world. The U.S. is not producing the learning and talent necessary to maintain our competitive advantage."

Under the Brown proposal, the centers of excellence would be established in five different regions of the country to undertake what the one-time presidential candidate and two-term Democratic governor called "qualitative research" into the long-range effect of computers on cognitive learning. The research centers would be staffed by computer engi-

neers, educators, psychologists and social scientists.

Nationwide program

For more immediate results, Brown said he would propose to Congress "a nationwide program of model schools for the intensive use of computers."

Under Brown's proposal, a number of schools in each state would be awarded one computer per child, based on an educational plan submitted in open competition with the state's other schools.

Brown said the proposal would be introduced in Congress next year and would call for the awarding of matching federal and state grants. He

admitted it would not reach the goal of having a computer available to every U.S. schoolchild, but said it would "elicit concrete thinking about how to use computers in the schools" and would help settle "the growing unease about unequal distribution" of personal computers among U.S. schoolchildren.

Responding to the growing perception that public education in the U.S. trails that in Japan, Brown said the Japanese are characterized by "a relentless desire to collect more and more information." Only by having computers available to them at school can American children be instilled with a similar desire, Brown maintained.

Until now, the four roadblocks to computers in the schools, according to Brown, have been a lack of teacher training, inertia in the U.S. system of public instruction, the high cost of computer hardware and the unavailability of good educational software. While computer prices have begun to come down, the other three obstacles remain, he said.

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College tries computer camp for girls only

COLUMBIA, Mo. — Are boys more adept at using computers than girls? Stephens College here thinks they are. In an attempt to balance the scales, the school is experimenting with computer camps for girls only.

Dr. Markita Price, head of academic computing at the college, said the popularity of video games among junior high school boys gives them an edge when it comes to learning how to run computer systems. Consequently, when placed in coeducational computer camps, the boys tend to learn faster, are more competitive and dominate the available computer systems.

According to national averages, boys attending computer camps outnumber girls by a 3:1 ratio, Price said, so Stephens College decided to experiment with a week-long camp for girls only earlier this month. Like many coeducational camps, the Stephens camps offered roughly six hours a day of computer instruction and six hours of other activities.

Women in computing

The only difference in the girls-only camp, Price said, is that it places a slightly greater emphasis on women in computing. Price added that the computer games used in the girls-only camps tend to be less violent than those used in coeducational camps.

Stephens College has offered the girls-only computer camps during the past two weeks, attracting 21 and 22 attendees, respectively.

The school plans to repeat the girls-only camps next year. The camps use mostly Apple Computer, Inc. Apple IIe and Apple IIc microcomputers, but IBM Personal Computers and Radio Shack TRS-80 Model 4 micros are also used.

NEWS

Forum hears good news, bad news about micros

By David Myers
CW New York Bureau

NEW YORK — According to experts, people have been telling each other and themselves unwitting lies about personal computers.

Personal computers do not resemble the human mind.

They will not make one's job more interesting or boost one's productivity.

They cannot magically transform a disorganized worker into a model of neatness.

That was the bad news that came out of an all-day forum here on "The Human Side of Personal Computing" sponsored by the Hayden Publishing Co. earlier this month. The good news is that computers do help entrepreneurs get ahead, provide men and women with the option of working independently and raise the level of people's expectations of what they are capable of achieving.

"You know the three great lies of man. Here are the two great lies of personal computers: 'This will make your job more interesting' and 'It will increase your productivity,'" said management consultant Matthew J. Puleo of Yankelovich, Skelly and White. In fact, personal computers on the job in America are used mainly for clerical tasks, he said.

Upper management within U.S. corporations often resists personal computers because the machines "do away with some external signs of success, such as having your own secretary," Puleo observed.

And as for productivity gains, Puleo said a desktop personal computer "may make you more effective, it may make you better, but not necessarily faster. The jury is still out on [productivity gains]."

Other speakers at the forum agreed with Puleo that seeking gains in productivity from desktop micros is asking the wrong thing from the machines.

Dr. Richard B. Byrne, a private consultant and professor of communications at the University of Southern California, said the important thing about personal computers is that they carve out new ways for men and women to work, to be creative. "It's not the old work, it's the new work [that personal computers promise to transform]. The reason productivity gains have been so small is that we're automating the industrial revolution electronically," Byrne added that bringing personal computers into an organization has the same effect as history's first four-minute mile; it raises the level of expectations. "A personal computer is like an amplifier in a stereo system — it makes you whatever you are, but more so."

Byrne described computer use as ascending upward in three levels, starting with users who view a personal computer as merely a machine. "They are primarily concerned with getting it to run," Byrne explained.

Users then rise to the level of employing the computer as a tool or an appliance, then finally to the level of playing it like a musical instrument. "You want to get the box to enhance your individuality. When a great pianist plays, you hear the spirit of the musician. You don't come up to him and say 'What a great piano! How many K does it have?'" Byrne said.

Byrne's statement echoed an earlier remark by Puleo, who said that the real promise of personal computers lies in their freeing people to "work outside of the system, to do their 'what ifs' on their own."

But the best computer users in an organization are those who understand that a personal computer gives them a competitive advantage, Puleo said. Installing desktop computers often transforms a firm's best and brightest workers into in-house entrepreneurs. "They understand technological change well enough to use it to get ahead," Puleo explained.

Entrepreneurship is what characterizes the microcomputer industry, according to Wall Street analyst Mi-

chele S. Preston of L.F. Rothschild, Unterberg, Towbin.

She cited the following people as the leading entrepreneurs in the micro business: Apple Computer, Inc.'s Steve Jobs and John Sculley; Microsoft, Inc.'s Bill Gates; Software Arts, Inc.'s Daniel Bricklin; Visicorp's Dan Fylstra; Lotus Development Corp.'s Mitchell Kapor; the IBM Entry Systems Division's Don Estridge; and Compaq Computer Corp.'s Rod Canon.

Three qualities stand out in computer entrepreneurs, Preston said. They have a consuming dream of making an impact on the world, they seek out risks and they are "willing to commit 200% of their time" to

their ventures.

However, to be successful, Preston said, the computer entrepreneur "must be successful at meeting the second challenge. That's the real key to the successful entrepreneur: the ability to do it again."

On the topic of whether computers bear any resemblance to the workings of the human mind, Dr. William R. Hobbs, a professor of behavioral medicine and psychiatry at the University of Virginia, said that computers only duplicate "the secondary processes of the mind, the conscious sequential thinking."

Unlike the human mind, the computer is incapable of instantaneous recognition," he said.

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NEWS

Venezuelan firm implements DP service in 18 months

VALENCIA, Venezuela — Outstanding results have been claimed here by the nation's ninth largest insurance company, which developed and implemented 85% of its entire data processing requirements in just 18 months.

Seguros Carabobo, C.A., built 17 different applications from scratch, ranging

from general ledger and payroll to detailed underwriting statistics. According to Rafael Alfonso, the consultant hired to spearhead the project, much of Seguros' success can be attributed to a fourth-generation software package from Hewlett-Packard Co., called Rapid 3000.

"Due to the level of development of third-world coun-

tries, systems work can be quite cumbersome in regions like Venezuela," Alfonso said. "The educational level of users and systems personnel is low when compared to a country like the United States. At Seguros Carabobo, for instance, the project was carried out by one project manager, four analysts and eight programmers — of

which only the project manager and two analysts [were] college graduates.

"Also, the rate of change is quite fast in developing countries — and this eventually affects most business routines. Venezuela, for example, had over 3,000 presidential decrees from 1974 to 1978, none of which required congressional debating or ap-

proval," Alfonso said.

"To complicate matters even more," Alfonso added, "let's not forget that all software manuals, messages and prompts are in English, and the language spoken in Venezuela is Spanish."

Consequently, MIS managers in third-world countries take a very long time to develop business applications. Further, by the time they finish, changes in business procedures usually make their systems obsolete or in need of major maintenance before installation.

In 1981, top management at Seguros Carabobo decided to renovate totally its computer department, and a business plan was carried out. Based on the plan, personnel were hired and fired, systems offices were expanded and refurbished and a new computer was acquired, Alfonso explained.

Key step

Selection of the computer system was the key step in the early stages of the project. "Our evaluation criteria was quite ordinary, except for the heavy emphasis on programming productivity," Alfonso said. "We were fortunate to have a selection committee whose members all identified development productivity as a crucial factor for the success of the overall project. We had heard about fourth-generation software, which at the time was still a fledgling concept, but we knew it was exactly what we needed."

An HP 3000 Model 44 was eventually chosen over four other computers that were considered. The choice was due largely to HP's Rapid 3000 software. The purchase was made in February 1982, and the equipment was delivered two months later.

The first five months in 1982 were spent establishing analysis, design and programming standards; setting up a development methodology; and planning all future computer activities. On June 15th, the systems development process was officially started. The final due date was set for December 31, 1983. Eighteen-and-a-half months were allotted for the development and implementation of the required 17 different applications.

"When we started, our task seemed very large," Seguros' systems manager Juan Ortega said. "But in 18 months, we analyzed, designed, programmed and implemented 17 totally interactive applications, made up of 912 separate programs, which produce 265 reports and handle 880 different screen designs. We've got six data bases, having a total of 284 files and 1,891 fields."

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Genicom 3000 PC printers feature switch selectable hardware, dual connectors and dual parallel or serial interfaces. Plus the 3014 and 3024 emulate popular protocols for both Epson MX with GRAFTRAX-PLUS™ and Okidata Microline B4 Step 2™, while the 3184, 3304 and 3404 emulate popular protocols for Epson MX with GRAFTRAX-PLUS™. So your current system is most likely already capable of working with these Genicom printers without modification.

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NEWS

British Airways touts UPS as Europe's most extensive

HEATHROW AIRPORT, England — The most extensive back-up power system in Europe is believed to be a \$2 million configuration that protects British Airways' newly built computer center here.

Because it is so important for the airline to maintain its operation at maximum efficiency, British Airways commissioned Holec Ltd. of Surrey, UK, an Anglo-Dutch electrical company, to install five Holec/Heemaf rotary, no-break sets, configured in parallel. If one set should fail or be out of service for maintenance, a full load can still be maintained by the remaining four.

The contract also called for three standby generators, a main distribution switchboard and a fuel storage and automatic transfer system.

The parallel configuration is available in diesel and battery versions. It filters and stabilizes the main electrical supply, as well as taking over instantaneously as a short-term emergency source of energy, should the main power fail.

System security is maximized by the rotating machinery's ability to supply short circuit currents of 10 times the full load capacity to operate the necessary protection, should a fault occur in one of the load feeders.

This uninterrupted power supply (UPS) architecture has the advantage of using fewer components, compared with traditional series-connected systems. It also avoids the complication of having to introduce on-load power conversion techniques for improving the quality of the main supply during normal operation.

"The [back-up] units have effectively demonstrated their ability to withstand constant on-off switching," said Colin Fromings, British Airways' Project Team Manager for the Comet House installation at Heathrow Airport. "The design of the overall multiple-machine system allows us to get at any part for maintenance without disturbing the power supply. Also, electrical efficiency has proved very good, much higher than any other system that we've used or studied."

Officers elected at DUG forum

KANSAS CITY, Mo. — Pat Pitkin, director of the Rochester Institute of Technology's Wallace Library, Rochester, N.Y., was elected president of the Data Phase Users Group (DUG) at the organization's fourth annual meeting here recently.

David Sheehan of Central/Western Massachusetts Automated Resource Sharing in Paxton, Mass., was elected vice-president.

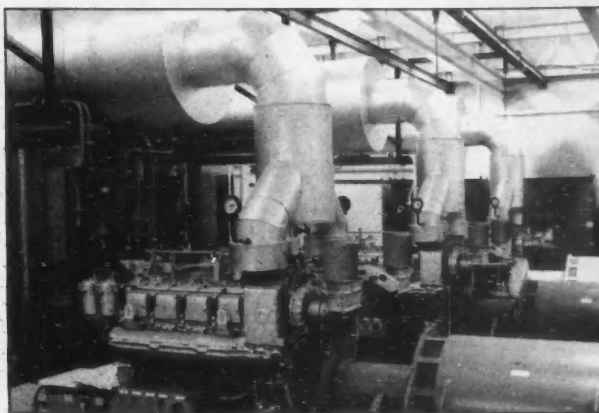
DUG consists of more than 70 library groups that use Data Phase Corp.'s Automated Library Information System.

More information is available from DUG, c/o Data Phase Corp., 9000 W. 67th St., Shawnee Mission, Kan. 66202.

The UPS sets at British Airways are responsible solely for protecting the computers; standby power for the computer center services — air conditioning, lighting — will be provided by three Auto-Diesels 650 kVA generators.

The main supply from the transformers to the switchboard, UPS and standby generators is carried by a cast-resin insulated bus-bar system, which British Airways believes will offer greater safety and durability than conventional cables.

"We're feeling very secure about our system," Fromings concluded.



British Airways backup power system

Banking Enters A New Era

Executives Tap PC Potential

As with every other area of our society, the financial sectors have become increasingly more reliant on the benefits of new technology. America's financial institutions have grown quite accustomed to the wonderful capabilities of computerized data processing, so much so that computers are now beginning to find their way into the upper level of today's banks — the executive suites.

Since the advent of the personal computer, banks have slowly but surely seen the advantage of developing "computer literate" managers. Technological familiarity, they reasoned, would create stronger leaders and more strategic applications for these new machines. And, indeed, the ability to use a personal computer has now become something of a prerequisite for the successful banker.

Unfortunately, the capabilities of personal computer software packages have not always matched the capabilities and needs of the bankers who use them. In fact, a whole range of important forecasting and analysis functions has been relatively inaccessible, simply because there has been no effective way to extract and summarize the necessary information from the mainframe system and analyze it on the PC.

Florida Software Services, Inc., has found the answer. The nation's leading supplier of innovative banking software has developed a unique mainframe-to-micro software system, called SERVICE LINK 2000, which is specifically designed to access the mainframe and the vital management information bankers need for high-level decision-making.

SERVICE LINK 2000 is a sophisticated mainframe software application that

Continued on page 6

New Era

Continued from page 1

automatically collects data summaries from the mainframe and down-loads this management information to the personal computer. This mainframe system is supported by a library of management-oriented personal computer programs, called Perc Paks, which enables bankers to perform current and future "what if" calculations concerning cost of funds, product pricing, and profitability analysis.

According to Richard A. Wolfe, president of Florida Software Services: "SERVICE LINK 2000 is an extraordinary management concept — a direct, on-line 'link' between the executive's personal computer and the bank's vital mainframe systems. Together with its library of PC programs, today's bankers can, at last, realize the full management potential for their entire financial information base from behind their very own desks — without the risk of blind market trials. It is, undoubtedly, the 21st Century banker's lifeline!"

For more information about SERVICE LINK 2000 and the Perc Pak library of personal computer programs, or any of Florida Software Services' other advanced mainframe applications, write to the company at P.O. Box 2269, Orlando, Florida 32802. Or call toll free 1-800-327-1892; in Florida, call 1-305-831-3001.

NEWS

OECD subcommittee to attempt accord on transborder data flow

By Bryan Wilkins
CW Washington Bureau

WASHINGTON, D.C. — On the final day of a meeting held here last March by an Organization for Economic Cooperation and Development (OECD) subcommittee to deal with transborder data flow issues, France submitted its version of how a regulatory framework should be erected.

"We were startled," Ken Leeson, a U.S. State Department official representative on the committee, recalled here last week. "It goes very much against the thrust of what [the U.S.] and hopefully the other OECD members want to see, which is the freer

and less regulated flow of information services and data."

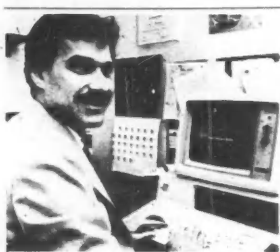
Next week, the OECD subcommittee on transborder data flow will re-gather in Paris to try to hammer out a "statement of general agreed intent" — an OECD policy on transborder data flow that the U.S. government and industry hope will liberalize and harmonize the regulatory treatment of the data flows. However, because of France's 11th-hour submission, U.S. officials are not optimistic that substantive progress will come of the meeting, according to Leeson, who addressed an industry advisory group here last week.

The French traditionally have argued for greater controls over multinational firms' data transmission needs, citing threats to a country's economic development and cultural identity and the "pauperization" of medium-size nations by the U.S., which has the most developed information economy. The French want to set up a regulatory scheme requiring large multinational corporations to declare the content of the data they want to ship out of a country.

According to the French scheme, data would be classified into one of three categories: traded data, which is exchanged through a formal contractual-type arrangement; nontraded data, such as information or data bases that are exchanged between a transnational corporation's subsidiary and home office; and data accompanying international trade, or information carried within the parts of a product or good that has been traded between one country and another.

The French suggested that the eight members of OECD agree on "proposed assumptions" regarding the three categories and that present and potential problems be listed for each category as a way of

See OECD page 39



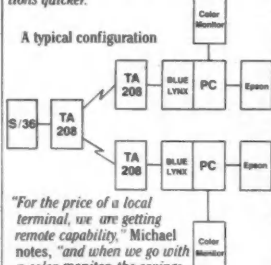
How Michael Krieger Made The Micro To Mainframe Connection

Michael Krieger is DP manager of Augustus Fashions, Inc., a leading manufacturer of quality men's and women's clothing. His responsibilities include providing efficient communications between the firm's Manhattan factory and two showrooms, and its warehouses on Long Island and in New Jersey.

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A typical configuration



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CIA chief says 300 firms diverting military high tech to Eastern bloc

By Bryan Wilkins
CW Washington Bureau

PALO ALTO, Calif. — The U.S. government has identified some 300 firms operating in more than 30 countries that are engaged in schemes to divert militarily critical high-technology products to Communist bloc countries, CIA Director William J. Casey said in remarks before a select group of high-tech executives.

Casey's remarks, made to an audience of Silicon Valley manufacturers on April 3 and dubbed the "Silicon Valley speech" by the CIA Public Affairs Office, were widely reported in Europe, but drew little attention in the U.S., presumably because they were delivered at the private Commonwealth Club here.

In his talk, Casey said the 300 firms are part of a "sophisticated international diversion operation" set up by Communist bloc countries to acquire computer and microelectronics know-how, especially from small, leading-edge Silicon Valley firms, where "security procedures are usually inadequate to protect against penetration by a determined, hostile intelligence service."

Communist intelligence agencies "also use sophisticated international diversion operations," Casey said. "We have identified some 300 firms operating from more than 30 countries [that are] engaged in such diversion schemes. And there are probably many more that remain unidentified."

Most of the illegal trade diversions to the Communist bloc are occurring by way of Western Europe, according to Casey.

The CIA would not identify the 300 firms cited by Casey. The Department of Commerce, which issues export licenses, and the U.S. Customs Service, whose Operation Exodus is aimed at catching illegal high-tech

exports, disclaimed any knowledge that a specific list of firms has been drawn up.

A CIA information officer said the CIA has no actual list of companies suspected of schemes to divert technology to the Communist bloc countries.

Only through the combined efforts of government agencies as a whole "have we identified the 300 firms," he said.

In his California speech, Casey said that acquisition of microelectronics production technology "is the single most significant industrial technology acquired by the Soviets since the end of World War II."

Prime target

Silicon Valley firms are "the primary target of Soviet and East European intelligence services," he said.

Processing and production technologies they acquired in the 1970s, he claimed, include wafer preparation, circuit mask protection, device fabrication and assembly and test equipment.

Turning to Japanese-U.S. competition in microelectronics, Casey said that "the continuing erosion of U.S. market share" is being met by an effort by the government to "bring to task U.S. companies who have failed to meet Defense Department specifications on contracts."

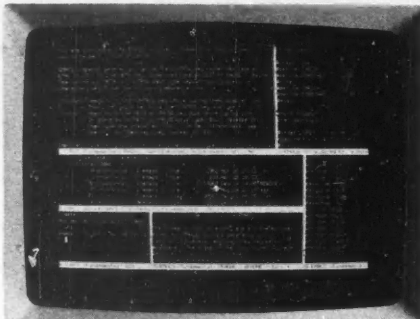
Casey added, "Increasingly in Europe and the U.S., domestic companies are serving as a Trojan horse for Japanese semiconductor and computer suppliers. . . . The Japanese companies such as NEC [Corp.], Fujitsu [Ltd.] and Hitachi [Ltd.] have made arrangements to supply top-of-the-line computers and permit domestic firms to affix their own labels."

"We view this as a dangerous course in a national security context as well as in a commercial context," Casey said.

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NEWS



**INTERNATIONAL
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AUSTRALIA

WANGARATTA — The first shipments of Australian-made versions of the IBM Personal Computer and Personal Computer XT went out last week, a month ahead of schedule. The machines are rumored to have gone to Hisoft Pty. Ltd., IBM's Dealer of the Year, which is expected to sell them to Australia's Hawthorn Institute.

MELBOURNE — Alpha testing reportedly started this week on a software product billed to be the first business applications generator for Unix operating environments. The software was developed by the Melbourne software house BBJ Computer Services Pty. Ltd. on a Wicat Systems, Inc. computer and is being sold through Wicat. It will soon be converted to run on Hewlett-Packard

Co.'s HP 9000 system, sources reported.

CHINA

BEIJING — Computerland Corp. of America has announced the completion of the first step in becoming the primary outlet here for microcomputer products produced in the rest of the world. A letter of intent to create a joint venture was signed recently by Computerland founder and chairman William Millard and officials of the Chinese Ministry for the Electronics Industry. The joint venture company would be called Computerland China and would open retail centers throughout the People's Republic. Negotiations are expected to be completed by the end of the year, according to sources.

HONG KONG

HONG KONG — Apple Computer, Inc. has issued a writ against local computer and electronic games maker

Video Technology Ltd., claiming copyright infringement on two of its computer programs. According to the writ, Video Technology has infringed copyright on Apple's Autostart and Apple-soft programs. Meanwhile, Video Technology is involved in an ongoing, unrelated dispute with Atari Corp. over Atari's popular Pac-Man video game.

JAPAN

TOKYO — Fujitsu Ltd. has enhanced its Facom V small systems series and unveiled a line of workstations and printers. The company boosted the memory of the V 830 from 2.75M bytes to 3.5M bytes; the V 850's capacity has been expanded from 3.5M bytes to 5.5M bytes; and the V 870 has been increased from 4M bytes to 7M bytes. The new workstation, called Facom 8010, is said to accept and send data to and from the V series' data base. The 768K-byte workstation is based on Intel Corp.'s 8086 microprocessor. A high-

speed Kanji-character nonimpact printer, the Facom 6900 A, was also released, according to the firm.

TOKYO — The Institute for New Generation Computer Technology, which is developing the fifth-generation computer, has unveiled a relational data base machine, calling it the "first step" in the development of knowledge-based computers. The machine will reportedly provide a test environment for the study of knowledge-based functions. It is comprised of an arithmetic processing unit and a hierarchically structured memory unit.

TOKYO — Plans are in the works for Storage Technology Co., Ltd. (STC) to produce magnetic storage devices and hard disk drives here in Japan within the coming year, according to Yoshinobu Noguchi, the president of STC Japan. STC intends to expand its business by building production facilities and establishing joint ventures, collaborative R&D projects and OEM pacts.

TAIWAN

TAIPEI — IBM has con-

tracted Taiwan's Institute for Information Industry to develop a series of Thai language software packages for use with the IBM 5550, a 16-bit system for which the institute developed a series of Chinese-language packages last year. The project will be completed in July, when IBM will begin marketing the machine in Thailand. The Thai-language packages are rumored to include word processing, accounting and other basic financial applications.

WEST GERMANY

BERLIN — "Individual Data Processing" was the theme of this year's IBM Users Congress, held here recently. According to IBM's conference organizer Paul Elsaesser, individual data processing should not imply do-it-yourself processing, nor should it mean collective or centralized information processing. Rather, Elsaesser maintained that development and maintenance of applications systems, such as information gathering and processing with data from already existing data base systems are all areas where individual data processing can be used best.

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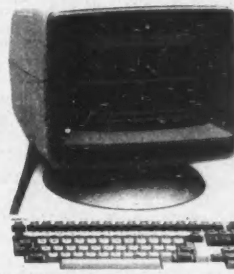
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NEWS

Stanford may contract firm for Decsystem replacement

By David Olmos
CW Staff

PALO ALTO, Calif. — Stanford University is considering a proposal from a small Silicon Valley manufacturer to build a replacement for Digital Equipment Corp.'s Decsystem-20 mainframes.

That announcement by Stanford, a large Decsystem-20 user, comes one year after DEC announced it had scrapped its Jupiter project to develop a high-end successor for its Decsystem-10 and 20 mainframes. The DEC decision disappointed many of DEC's more than 1,000 Decsystem customers worldwide, including Stanford, which had been counting on the project for an upgrade path.

"When Digital managed that project into the ground or failed to wish it to succeed — I don't know which it was — they really did us a great disservice," said Len Bosack, director of computer facilities for the computer sciences department at Stanford, whose campus houses 10 Decsystem-20s. "In terms of the size of the enterprise and the real financial and intellectual impact on the university, we depend on [the Decsystem-20s] very, very heavily."

Unacceptable alternative

At the time DEC announced it had killed the Jupiter project, the vendor proposed an alternative for Decsystem users whereby they could tie the 36-bit computer system into the 32-bit VAX-11 superminicomputer line through the firm's "interconnect cluster concept" and Xerox Corp.'s Ethernet local-area network [CW, May 30, 1983]. But Stanford found DEC's VAX alternative unacceptable.

"We have had 36-bit architecture machines at Stanford for almost 20 years now," Bosack said. "Over the course of that time, we have constructed — both ourselves and based on software Digital provides — an environment that is very well-suited to the work that we do here."

DEC claimed that its VAX alternative does not require a conversion, but Sandra Lerner, director of computing facilities at the Graduate School of Business, said a costly conversion would be involved that would require changing all programs accumulated during nearly a 20-year period at Stanford.

Several thousand students, faculty and staff would have had to be retrained, she added.

The university has some programs that have been under development for a decade; this is especially true of the large artificial intelligence systems based on the Lisp language. "I can't begin to describe to you how hard it is to move something like that to another computer," Bosack said.

Bosack said the university looked to the future and determined it did not want to convert to a different environment twice. "We see certain developments on the horizon, both in research institutions and commercially, that in the 5- to 10-year time-frame will provide an environment which we think will be genuinely better, which will be worthwhile converting to," Bosack said.

Stanford is, therefore, considering a contract with Foonly, Inc., a Mountain View, Calif., manufacturer of DEC-compatible systems, that would involve two machines costing a total

of about \$1.5 million. Foonly is owned by former Stanford student, David Poole.

According to Ralph Gorin, director of Stanford's academic computer center called Lots, the Foonly F1B system is an outgrowth of design work done by Poole and others while at the Stanford Artificial Intelligence Laboratory. The F1B is completely compatible with the Decsystem-20, he said.

Bosack said the F1B boasts a computing power roughly four times faster than the Decsystem-2060 and 10 times faster when doing floating-point computations.

Although Foonly is the only company to submit a formal proposal to

the university, Bosack said two other companies, Tymshare, Inc. of Bethesda, Md., and Systems Concepts, Inc. of San Francisco, also have expressed interest in the idea.

Decsystem-20s are the most numerous large systems on the Stanford campus. The systems are used by the Graduate School of Business, the Department of Electrical Engineering, the artificial intelligence project at the Sumex medical center and the Center for the Study of Language and Information.

The Stanford University Network (Sunet), a universitywide computer communications network, ties together the 10 Decsystem-20s, about 20 medium-size computers, about 100

workstations and nearly 400 terminals and microcomputers.

Rose Ann Giordano, DEC's vice-president of large systems marketing, said the company does not consider the Stanford move as a rejection of DEC products. She noted that the university is continuing to purchase Decsystem-20s and is involved in a research and development program with DEC to establish a campuswide distributed computing network.

"Obviously [Stanford] did want the Jupiter," Giordano said. "But we have come out many times and given our reasons for why we thought it was in the best interest of our customers and Digital to cancel that."

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NEWS

Relational DBMS keeps tight rein on consultant's plans

MONTREAL — With projects as diverse as offshore oil exploration, development of a telecommunications network and electrification of a 50,000-sq km region in Saudi Arabia, the SNC Group believes in strict project controls.

SNC, which is Canada's largest engineering consulting firm, provides project management, engineering, procurement, construction and commissioning services to clients around the world. Its 5,000 employees operate out of engineering offices in Montreal, Toronto, Calgary and Edmonton and project sites throughout Canada, Africa, India, Saudi Arabia and South Africa. On occasion, hundreds of people may be involved in a

single project.

SNC is involved in all aspects of an engineering project, from initial concept through construction. To control each stage, SNC developed a computerized project management and control system on Digital Equipment Corp.'s VAX-11/780 superminicomputer using Oracle, a relational data base management system (DBMS) from Oracle Corp.

Normand Bouffard, manager of SNC's project systems services, explained that the system is a network of interconnected modules. Each module performs a specific data processing function that may require the interchange of data processed by other modules. As many as 25 people

might need to access data concurrently, he said.

According to Bouffard, Oracle is the core of every SNC-developed module. The on-line modules share and build upon common data and have processing and inquiry capabilities. In addition to SNC-developed modules, the firm has also purchased off-the-shelf application software packages that fit into the project control system environment.

Because the Oracle DBMS is based on IBM's English-like Standard Query Language (SQL), the user need not know a sophisticated computer programming language in order to access information, Bouffard said.

Oracle presents data in two-dimen-

sional tables. At SNC, the data base currently consists of about 60 tables. All the tables can be subsetting and/or combined using the SQL query language and the result maintained as a "view," or virtual table.

SNC's goal was to develop control systems for use on engineering, procurement and construction projects. The systems needed to be interactive so that the construction team, for example, could access the data entered by procurement or inspection teams, Bouffard said.

The first priority was a material control system to track equipment from the initial requisition through the time it is issued to a foreman at the construction site. The system provides status, cost and delivery date, as well as vendor information, bills of material and construction inventories.

Materials management system

The major system developed using Oracle so far is a materials management system oriented toward piping jobs, Bouffard said. The Piping Bulk Material Control System is used to track materials from procurement through installation.

Before SNC began using Oracle, Bouffard explained, all processing was done in batch. With Oracle, however, systems in each of the areas operate with data from the other systems.

For example, SNC developed an interface between Davy Computing, Ltd.'s Compaidd application package, which stores isometric piping bills of material, and the firm's petrochemical jobs.

In this way, the Piping Bulk System always has the most current parts/commodity catalog and isometric bills of material, Bouffard said.

Any revisions made to Compaidd automatically trigger an update of the Piping Bulk Material Control System. Project procurement personnel build upon existing information rather than reentering information.

SNC considered three DBMS before deciding on Oracle. Bouffard said the decision was based on four factors: its reputation as a proven relational DBMS, ease of use of SQL, data integrity features and prototyping tools.

Used with standard languages

The Oracle query language is SQL-Plus, a superset of SQL. In addition to standard nonprocedural features, SQL-Plus can be used from programs written in all standard programming languages, allowing SNC to use its existing Cobol programs.

Oracle's Interactive Application Facility can be used to define, query and update screen-oriented applications, and the Interactive Report Writer can format automatically the output of an SQL-Plus query into reports and other documents, Bouffard explained.

Since installing Oracle, Bouffard said his group has been able to support the project team at remote sites, as well as the management team at company headquarters. With terminals installed at remote project sites to support such functions as inventory control and labor productivity, the people using the systems are the ones who are actually performing the work.

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NEWS

Maintenance eases Avis head crashes

GARDEN CITY, N.Y. — When Avis Car Leasing, Inc. began experiencing an inordinate number of head crashes, its information systems director discovered that supposedly maintenance-free removable disk packs ran best with semiannual preventive maintenance checks.

"We really need reliability with our interactive system because so many people depend on us to carry out the company's car leasing business. The most important thing is the integrity of the data," said Joel D. Rubin, director of information systems for the subsidiary of Avis, Inc. based here.

Explained Rubin, "We support the whole life cycle of car leasing, from initial customer leasing information all the way through used-car sale of the vehicles, and we produce accounting reports for the billing and accounts receivable functions. Crashes and delays are a big problem for those farther on in the system who depend on our reports to do their work, as well as giving everyone a bad impression of the data processing support."

The crash problem appeared in late 1982. The company uses three Computer Automation, Inc. Syfa minicomputers and 75 removable disk packs for four Control Data Corp. Model 9762 disk drives and six CDC Model 9766 disk drives. The drives provide more than 2G bytes of on-line storage. One processor and 32 terminals are used for interactive tasks from 8 a.m. to 8 p.m. A second processor is used for backup and batch processing, including daily batch processing from 8 p.m. to midnight, while the third is used for development.

Rubin said engineers advised against using mechanical cleaning devices and recommended the manual cleaning system of Precision Methods, Inc., a Lorton, Va., firm that provides disk maintenance, re-

pair and refurbishing.

For approximately \$1,400 annually, PMI technicians visit Avis every six months, check for contamination, such as burned oxide deposits on the disks, and manually clean disks, covers, shields and hubs, Rubin said. The technicians also provide written reports on their inspections, allowing Avis to correct whatever is causing the contamination.

The maintenance is performed on Sundays, when Avis shuts down its system for other types of maintenance.

"Removable disk packs were thought to be maintenance-free when they were first introduced, but even the manufacturers now recognize

that contamination can occur," Rubin noted. "I look at PMI's preventive maintenance as an insurance policy. Their service gives me an opportunity to detect problems before they occur. It also has made us more aware of the proper method of handling disk packs."

In addition to providing better service, eliminating head crashes means less work for those in the computer room. "Crashes are a problem here, too. It means we have to go back to the previous day's backup, restore those files and then reenter all of the transactions and information that had been keyed in up until the time of the crash. That's a rather onerous task for the staff," he said.



Joel Rubin, director of information systems for Avis Car Leasing's DP center in Garden City, N.Y.

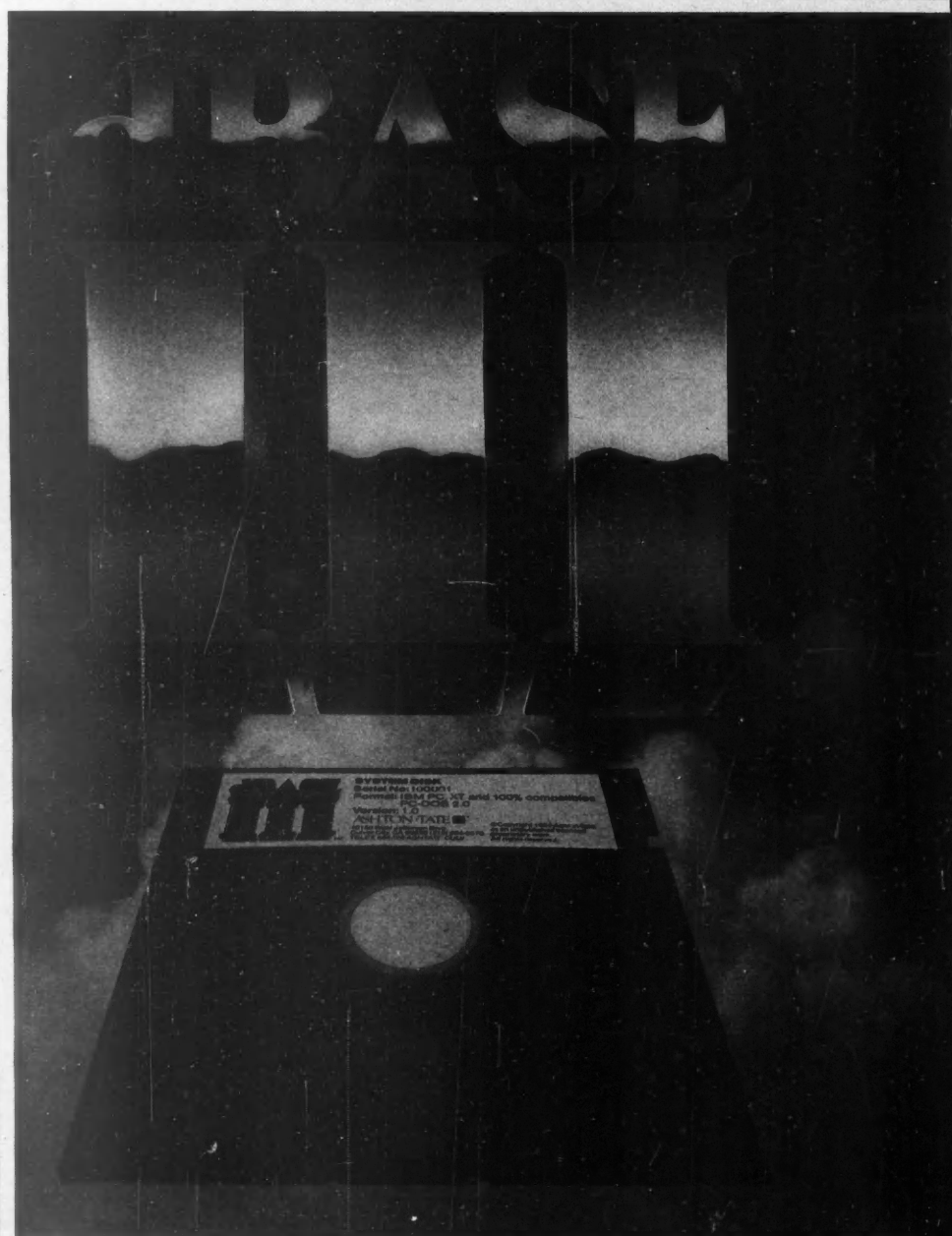
IEEE names president-elect

BOSTON — Charles A. Eldon, manager of capital equipment of Hewlett-Packard Co. of Palo Alto, Calif., was named president-elect of the Institute of Electrical and Electronics Engineers (IEEE) at a recent special meeting of the IEEE assembly here.

Eldon will replace Dr. Donald D. King, who died March 13. Eldon will become the 1985 IEEE president on Jan. 1, 1985. The 1984 IEEE president is Dr. Richard J. Gowen, vice-president and dean of engineering, South Dakota School of Mines and Technology in Rapid City, S.D.

Eldon is responsible for capital equipment acquisition for manufacturing processes for HP worldwide, including processing engineering studies, corporate purchase agreements and vendor relations. Long active in the IEEE, Eldon served as treasurer in 1981-82.

The IEEE has 250,000 members in over 120 countries and is one of the world's largest technical professional organizations.



NEWS

Local net helps Big Eight firm save on documents

NEW YORK — A Big Eight accounting firm, using a local-area network with computer workstations and laser printers, said it has saved \$300,000 on one document creation project and is reducing the time required to prepare other documents and publications by 50% to 75%.

Peat Marwick International recently decided to take advantage of advances in microcomputer technology for performing analysis of work paper used by auditors in field offices. The application of work paper analysis to eight specialized industries would require the generation of 180 different matrices.

A cost analysis of preparing these forms using traditional methods

showed that approximately \$2,000 would be needed for each document — a total of \$360,000 for the project. A less costly solution had to be found.

After investigating noncomputerized methods of creating the work papers, the company's production services department decided on a Xerox Corp. integrated office system and an Ethernet local-area network. According to Peat Marwick, the deciding factor was that the Xerox systems reduced the estimated cost of \$2,000 per individual spreadsheet data collection document to \$140, a reduction of 93%.

Moreover, document generation costs continue to decrease as opera-

tors become more familiar with the features of the systems, the company said.

Peat Marwick's all-Xerox local-area network is comprised of three 8010 Star Information Systems, an 860 information processing system, a rigid disk file server for mass storage of information and a laser printer that prints at rates up to 3,000 word/min. A coaxial cable joins the devices together and provides for high-speed communications among them.

The network is cutting costs in other applications as well, according to Barbara Kayton, director of administrative services. Graphics artists and other department users can operate the system after two weeks

of self-training and can be highly effective after three months.

"Since the network was installed in October 1982," Kayton said, "it's proven itself more than cost-justified for other applications besides the work papers. Prior to the network, technical manuals running from 150 to 900 pages would be submitted to us by our technical specialists. We would edit the copy for style, format and content and send the material back for the approval process. Sometimes a single manual would receive 20 sets of changes."

"Then we would send the manuscript outside to a typesetting vendor. We would get galleys, page proofs and then reproducible copy that was sent to an outside printer," she said.

Course materials for Peat Marwick's executive education program also are processed on Ethernet. "We produce materials for 57 standard courses each year," Kayton said. "Some standard courses are adapted to fit specific client needs. Instead of starting from scratch, we use the Ethernet system to pull elements of the course together and make the adaptation necessary to a particular client. Here again, we save 50% to 75% of the time it used to take up to adapt a course."

In a similar manner, the network system is used to create manuals for use in the U.S. and abroad. With the 8010's capabilities of reproducing entire blocks of stored copy and inserting special copy where needed, special editions of each manual are quickly produced for international offices.

As a result of cost and time savings like these, utilization of the network system has steadily increased, and to meet the added demand, Peat Marwick is upgrading its 80M-byte file server to one that will provide 300M bytes of mass storage.

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Softcon merges two conferences

CHESTNUT HILL, Mass. — North-east Expositions has merged the two Softcon conferences planned for spring and fall 1985 into a single event that will be held March 31-April 3, 1985.

The move was made, according to spokesman Bill Mahan, because computer shows have reached a saturation point and exhibitors would rather have one firmly entrenched annual show than multiple exhibitions.

Softcon 1985 will differ from Softcon 1984 by having a stronger emphasis on international markets. In addition to targeting merchandisers, distributors and volume business users in North America, Softcon marketing will target key attendance groups in Europe, Japan, the UK and other selected overseas markets.

Registration for Softcon is \$35 for an exhibits-only admission or \$195 for the four-day conferences and exhibits badge. More information is available through Softcon, c/o North-east Expositions, 822 Boylston St., Chestnut Hill, Mass. 02167.

NEWS



CALENDAR

WEEK OF SEPT. 2

SEPTEMBER 4-7, NEW YORK — **TSO ISFF**. Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

SEPTEMBER 4-7, NEW YORK — **CICS Application Design**. Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016. Also being held Sept. 10-13 in New York.

SEPTEMBER 5-7, WASHINGTON, D.C. — **Configuration Management of Software Programs**. Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

SEPTEMBER 5-7, SAN JOSE, CALIF. — **Office Automation and the Technology Revolution**. Contact: Data-Tech Institute, 386 Franklin Ave., Nutley, N.J. 07110. Also being held Sept. 12-14 in Columbus, Ohio.

SEPTEMBER 5-7, CHICAGO — **Structured Analysis for Users**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 5-7, ALBUQUERQUE, N.M. — **New Gateways to SNA**. Contact: Data-Tech Institute, 386 Franklin Ave., Nutley, N.J. 07110.

SEPTEMBER 5-7, NEW YORK — **Managing Projects in the Structured Environment**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 5-7, TORONTO — **Capacity Management Forum**. Contact: Institute for Information Management, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

SEPTEMBER 5-7, WASHINGTON, D.C. — **Artificial Intelligence**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 6-7, SAN FRANCISCO — **Systematic Software Testing**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 8-9, NEW YORK — **CICS Internal Architecture**. Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

WEEK OF SEPT. 9

SEPTEMBER 10-11, BOSTON — **Fourth-Generation Data Management Software**. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

SEPTEMBER 10-11, WASHINGTON, D.C. — **DBS IV**. Contact: Seminar Registration, Phillips Publishing, Inc., Suite 1200N, 7315 Wisconsin Ave., Bethesda, Md.

20814.

SEPTEMBER 10-11, HASBROUCK HEIGHTS, N.J. — **Supporting and Maintaining the Data Communications Network**. Contact: Data-Tech Institute, 386 Franklin Ave., Nutley, N.J. 07110.

SEPTEMBER 10-12, TORONTO — **The Second International Congress on Computer Security (IFIP/Sec '84)**. Contact: IFIP/Sec '84, International Security Congress, 160 Duncan Mill

Road, Don Mills, Ont., Canada, M3B 1Z5.

SEPTEMBER 10-12, NEW YORK — **IMS Utilities**. Contact: Sysed, Inc., One Park Ave., New York, N.Y. 10016.

SEPTEMBER 10-14, MINNEAPOLIS — **Structured Programming Workshop**. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 10-14, NEW YORK — **MVS JCL**. Contact: Sysed, Inc., One

Park Ave., New York, N.Y. 10016.

SEPTEMBER 10-14, PARIS — **The Sixth International Congress of Cybernetics and Systems of the World Organization of General Systems and Cybernetics**. Contact: Association Francaise pour la Cybernetique Economique et Technique, 156 Blvd. Pereire - F. 75017, Paris, France.

SEPTEMBER 10-14, BOSTON — **Structured Analysis and System Specification**

Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 10-14 in Houston.

SEPTEMBER 10-14, WASHINGTON, D.C. — **Operating Systems for Microcomputers**. Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

SEPTEMBER 10-14, ANAHEIM, CALIF. — **Structured Design for Real-Time**



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Systems. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 10-14, NEW YORK — Data Base Development Workshop. Contact: Learmonth & Burdett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

SEPTEMBER 10-14, PHOENIX — Project Planning and Control Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 10-14, HOUSTON — MVS/SP & XA. Contact: Computer Systems Research, Inc., 40 Darling Drive, Avon, Conn. 06001.

SEPTEMBER 10-14, CLEVELAND — Structured Analysis and Design Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036. Also being held Sept. 10-14 in Denver.

SEPTEMBER 10-14, ATLANTA — Structured De-

sign Workshop. Contact: Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

SEPTEMBER 11-12, CHICAGO — Information Centers. Contact: Software Institute of America, 8 Windsor St., Andover, Mass. 01810.

SEPTEMBER 11-12, DALLAS — Integrating the Mainframe and the Micro in the Corporate Environment. Contact: Institute for Advanced Computing Technology, Suite 108, 1433 Santa

Monica Blvd., Santa Monica, Calif. 90404.

SEPTEMBER 11-13, DALLAS — Midcon/84 High-Technology Electronics Exhibition and Convention. Contact: Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, Calif. 90045.

SEPTEMBER 11-13, DALLAS — Data Base Administration and Data Resource Development. Contact: Software Institute of America, 8 Windsor St., An-

dover, Mass. 01810.

SEPTEMBER 11-13, DALLAS — Mini/Micro Midwest-84 Computer Conference and Exhibition. Contact: Electronic Conventions, Inc., 8110 Airport Blvd., Los Angeles, Calif. 90045.

SEPTEMBER 11-13, BOSTON — Electronic Imaging 1984. Contact: Electronic Imaging 1984, Morgan-Grampian Expositions Group, 2 Park Ave., New York, N.Y. 10016.

SEPTEMBER 11-13, ARLINGTON, VA. — Voice Input/Output Systems Applications Conference 1984. Contact: Association of Voice Input/Output Systems, P.O. Box 60904, Palo Alto, Calif. 94306.

SEPTEMBER 11-14, LOS ANGELES — Unix Systems Expo/84. Contact: Computer Faire, Inc., 181 Wells Ave., Newton, Mass. 02159.

SEPTEMBER 11-14, WASHINGTON, D.C. — Distributed Processing: Mini and Microcomputer Implementations. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in Boston.

SEPTEMBER 11-14, WASHINGTON, D.C. — Data Communications. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in San Diego.

SEPTEMBER 11-14, LOS ANGELES — Designing Real-Time Systems: A Hands-On Workshop. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 25-28 in Washington, D.C.

SEPTEMBER 11-14, WASHINGTON, D.C. — Designing with 16-Bit Micros. Contact: Ruth Dordick, Integrated Computer Systems, P.O. Box 45405, 6305 Arizona Place, Los Angeles, Calif. 90045. Also being held Sept. 18-21 in Los Angeles and Sept. 25-28 in Long Island, N.Y.



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NEWS

Conference explores integration of robots, computers

By Edward Warner
CW Staff

DETROIT — An increasingly close relationship between the computer and the robot means that robots can now be programmed off-line — without shutting down an assembly line — and that manufacturers can model robots on a computer-aided design and manufacturing (CAD/CAM) system, even before the robots are purchased.

Those advances were noted in presentations and product announcements at Robots 8, the international conference on robotics held here earlier this month. To allow manufacturers to preview how a robot will function at its work site, several manufacturers displayed robot modeling packages running on CAD/CAM systems, and one engineer discussed, in a seminar, a software program that he authored to provide a similar function, but on a microcomputer.

In the off-line programming arena, GMF Robotics, the joint venture of General Motors Corp. and the Japanese robot maker Fanuc, introduced a robot programming workstation, and IBM discussed its extensive efforts in that field.

Off-line programming

All IBM robots can be programmed off-line by IBM Personal Computers or IBM Series/1 minicomputers, according to Mike Condon, a strategic planning manager for IBM's Manufacturing Systems Products independent business unit. Without off-line programming, Condon explained, robots must be programmed via their controllers, which requires the unit to be taken out of service.

"You have to have off-line programming or you tie up your facility," Condon said in an interview.

Condon couldn't say how many robots IBM has in use at all of its manufacturing facilities — there are 250 alone at one plant in Lexington, Ky., he noted — but he did point out that the firm's plants in Tucson, Ariz., and Raleigh, N.C., use robots extensively. The Tucson facility integrates the computer with the robot so completely that a central data base, running on a 4300 series IBM mainframe there, downloads to each robot, in a work cell making printed-circuit boards, the name of each part needed and how it should be installed.

Such extensive computer integration, Condon said, means that the circuit board assembly area is flexible enough to switch quickly from making one version of the product to another, all on the basis of commands from the mainframe.

GMF's new Smartware workstation for off-line robot programming, introduced at Robots 8, focuses on the logic side of robot programming, where GMF spokesman Steve Penn said 90% of a robot's programming occurs. Logic programming, he explained, covers the robot's interaction with the assembly line and other machines, while geometry programming, which covers the robot's scope of movements, is still best done at the robot controller.

Using the Smartware workstation, he said, new robot programs can be written for robots that are still at work or for robots that have yet to be installed. When it comes time to change programs, the workstation

can transfer the program to the robot via an RS-232 connection or on a bubble cassette. In addition, standard portions of programs can be shared among several robots, and the robot's self-diagnostics can be read at the workstation, again via the RS-232 connection, to allow analysis of a robot failure.

By moving the robot programming function to a workstation, Penn said, programmers are less likely to make errors than if they were "standing out on the production line with the machine running" while they tried to program it.

In the robot-modeling sector, IBM displayed its AML/Entry Application Simulator software for its Personal

Computer XT, which models the movements of a Scara-type robot within a work area. The software presents a color, two-dimensional picture of the robot's mechanical arm at work. Similar software for IBM's Catia model CAD/CAM system can model a robot's movements three-dimensionally, Condon said.

McDonnell Douglas Automation Co. (McAuto), meanwhile, displayed its Place robot modeling software for use on its Unigraphics CAD/CAM system and, with an interface, on other firms' CAD/CAM hardware. The software, which displays a color animation of the robot arm in action, allows users to "model it here and play 'what-if,'" said Wes Kliner, a

McAuto marketing representative. A modeling package is based on a robot's movement specifications, provided by the robot manufacturer and can help users avoid buying a robot that won't fit their particular application, Kliner said.

On a smaller scale, Tom Winslow, a Hewlett-Packard Co. engineer, discussed in a seminar his program for modeling — on a HP 86B, HP 85 or HP 87 microcomputer — the movements of a robot arm. Winslow developed the software after his firm purchased a robot that was ill-suited to its application. The mistake could have been avoided, he said, if some means had been available to preview the mechanical arm's movement.

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NEWS

Portable word processor eases PepsiCo's work load

PURCHASE, N.Y. — When the word processing department at PepsiCo, Inc.'s corporate office here became overtaxed, the company turned to a portable word processor to help ease the work load.

At PepsiCo's corporate office, the Office Information Service (OIS) center expedites paperwork generated by five PepsiCo business segments: beverages, food products, food services, transportation and sporting goods. Two years ago, the word processing department began experiencing trouble meeting these departments' needs, so it began to look at a portable product to improve productivity.

But "there were few portable

products on the market then," said Mary Ann Herrmann, OIS center supervisor. One product that met OIS' needs was Sony Corp.'s Typecorder, a battery-operated, 3-lb word processor. The unit, which fits in a briefcase, features a full-size keyboard, a one-line 40-character display and the ability to store up to 100 pages of text on a microcassette tape.

Because employees would be using the machine while they were out of the office, PepsiCo included an acoustic coupler and a 6-lb compact printer when it purchased its two Typecorders for \$2,000 each.

Typecorder has supplied a quick and simple means of providing employees with more flexible work

schedules, according to Herrmann. "Employees are encouraged to use the Typecorder while traveling or for projects that require working at home," Herrmann said.

For example, corporate affairs writer Tony Sheldon-Moir gathered information for PepsiCo's annual report by visiting 15 cities where PepsiCo divisions and subsidiaries are based. "Instead of taking a typewriter, Sheldon-Moir brought the Typecorder and was able to file his reports from each city to PepsiCo headquarters by using the acoustic coupler," Herrmann said.

For PepsiCo's mass mailings, the Typecorder is also a boon. Eileen Foley, a secretary in the corporate af-

fairs department, recently used it at home to meet the deadline for a mass mailing. She entered the addresses on the Typecorder's microcassette and then transferred them the next morning to compatible Wang Laboratories, Inc. Wangwriter word processing equipment.

Office services manager Angelo Cappello and Herrmann first spotted the Typecorder at a dealer show. By writing a term paper on it for an evening study course, Herrmann taught herself to use the product.

Typecorder is available to other departments; Herrmann trains those employees who wish to use the machine.

"Most users take the machine out for a few months," she said. "I would estimate that they use it a few hours each day. To date, we've found the Typecorder most useful for such projects as written reports and mass mailings."

Five added to OMA board; meet scheduled

AUSTIN, Texas — Five new members have been recently added to the board of directors of the Operations Management Association (OMA), including executives from IBM, the 3M Corp. and Management Science America, Inc.

The new members of the board are Bill Jones, director of production and business systems for IBM in Atlanta; Ray L. Dicasali, vice-president of Management Science America's, Manufacturing Systems Division in Winston-Salem, N.C.; and Cal Pipal, division vice-president of 3M in St. Paul, Minn.

Representatives from two universities were also elected to serve three-year terms on the board. They are Brooke Saladin, an assistant professor in the Babcock School of Management, Wake Forest College, Winston-Salem; and Robert Britney, a professor in the School of Business, University of Western Ontario, Canada.

Headquartered here, the OMA, created in 1981, is a cross-industry organization made up of executive-level management personnel and designed to address and strengthen the management of business and industrial organizations, according to Roger Schroeder, director of the Operations Management Center at the University of Minnesota and current OMA president.

The theme of the OMA's annual conference, to be held on Nov. 8 in Toronto, will be "Restructuring Operations to Meet the Competitive Challenge."

The registration fee for the conference is \$95 for OMA members and \$125 for nonmembers, according to a conference spokesman.

More information about the upcoming conference in November is available from James Fitzsimmons, Treasurer, OMA, Department of Management, University of Texas, Austin, Texas 78712.

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EDITORIAL

You can't always count on vanity

A few years ago, an unassuming computer consultant named Stanley Mark Rifkin devised an amazingly simple plan to steal money.

By eavesdropping on the electronic funds transfer wire room at the Security Pacific Bank in Los Angeles, Rifkin obtained a code that enabled him to manipulate the bank's computerized EFT system. He transferred \$10 million from Security Pacific to a foreign bank account, then converted the cash to diamonds.

It was only Rifkin's vanity that snared him. He could not resist the temptation to brag about his exploits.

Now an empirical survey from the American Bar Association [CW, June 18] has clearly shown that computer crime is a pervasive specter — more pervasive than DP managers and their bosses would like to admit. Furthermore, the problem is getting much worse. It seems that the gulf between computer technology and computer security technology is widening.

And, the survey found, we apparently are raising a generation of young computer users who don't think much about violating privacy or property via a computer. Maybe that's what happens when one's first exposure to a computer comes at the end of a joystick that can blithely destroy legions of soldiers, sailors and aliens.

So something has to be done, the experts say. But what?

If there's one thing analysts agree on, it is that any computer system can be compromised. The more formidable the security, the greater the value, ostensibly, of the secrets locked within — and the greater the challenge to those who seek to steal, alter or destroy.

Thus, some broad plan of attack must be launched on two fronts — one by the government and one by the private sector. Interestingly enough, the strongest measures to combat computer crime have come not from corporate boardrooms, but from state legislatures around the country. More than 30 states now either carry anti-computer-crime statutes on the books or are mulling over legislation to do so. Legislators are talking about tougher penalties for computer crooks, tacit recognition that computer-aided crimes or actions that destroy vital electronic data are every bit as serious as less sophisticated crimes.

Tougher statutes notwithstanding, the ABA study found that an effective federal and state ability to prosecute is lacking. Could this be due to a failure on the part of business to cooperate fully with prosecutors?

That seems a possibility, given another finding in the ABA study that most computer crime perpetrators work within the company whose system is hit, and for the most part, these individuals are disciplined internally — and quietly. Federal and state authorities never know what happened and thus are powerless to impose the more harsh detriments to computer crime.

If business is really serious about stemming the rise in computer crime, it will have to get much more serious about dealing with the known cases. It does no good to clamor within the legislatures for tougher laws when private business then turns the other cheek when one of its own gets caught.

After all, you simply cannot always depend on a crook's vanity.



with acknowledgements
to Bill Maslin
JIM
OPEN
computerworld

LETTER

Documentation problems

I agree with the points made in the In Depth article "The tyranny of words" [CW, April 16]. However, the article overlooked a number of problems.

First, any machine that is reviewed, including its documentation, is always reviewed before the documentation is ready (there is always an apology about the temporary nature of the manuals). If people really do read and take notice of reviews, then those of us who are going to the trouble of producing high-quality documentation are hardly being given the edge we deserve.

Second, who is to produce such documentation? The small software houses often cannot afford the considerable expense of such documentation, and if the company is big enough, then it is cheaper to turn down bulk purchase orders demanding good documentation — there are plenty of people who will buy the software without it.

Third, given a choice, do you go for the best software or the best documentation? Naturally, good documents can increase the usefulness of the

software, but the choice is not always easy.

Last, the costs. Manuals have to be varied to suit the various users who may speak another language, have a flexible disk machine instead of hard disk and so on. For example, there is enough difference between the British and American language, and between the cultures, (and that's not including technical and software differences) to warrant a separate version.

Richard Thomson
Apeldoorn, Netherlands

Computerworld welcomes letters from its readers. Preference will be given to typed, double-spaced letters of 150 words or less; they may be edited for the purposes of clarity and brevity.

Letters should be addressed to Editor, Computerworld, Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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VIEWPOINT

Management issues affecting DBMS success



THE DATA CENTER

John P. Murray

This is the fourth in an eight-part series.

The data base management system (DBMS) is not the panacea it may appear to be or is often purported to be by the software salesman. However, a sound DBMS, correctly installed and adequately supported, can become a catalyst that can be used to move the organization ahead.

A good DBMS really does offer the opportunity to deliver many of the as yet unrealized promises of management information systems to the organization. The extent to which that delivery occurs within a particular organization is tied to two critical factors. The first is that of the support for the DBMS within MIS and willingness of MIS management to assume reasonable risk to push the DBMS effort aggressively. The second factor has to do with the willingness of the organization's senior management to understand both the magnitude and the potential benefits of the DBMS effort and then to make and sustain the commitment to its success.

Note that nothing has been said about the technical issues involved in the installation and maintenance of the DBMS. These issues have not been forgotten or ignored — they are indeed important considerations — but in my view, they are not the critical issues.

Why not? Because the technology, that is, the hardware and software, have advanced to the stage where, while they can be difficult and frustrating, they are manageable. Given that circumstance, hardware and software should be considered secondary to the critical DBMS issues, which are political, emotional and managerial. Provided a

competent staff and a well-chosen DBMS package, success is contingent upon those three issues.

Given that premise, the successful management of the data base environment requires a different set of skills and knowledge than that which has been the case in the traditional MIS department.

Successful DBMS environment defined

Understanding the concept of a successful DBMS environment is key. In my opinion, the successful DBMS environment is that which has set the course for and is making progress toward the following:

- An environment where as much of the organization's data as is practical (something above 85%) is resident in a data base environment. This may mean multiple data bases, but not multiple data base management systems.

- That data is, as a matter of policy, made readily available to those who have authority to use it on a basis as free from MIS constraint as possible.

- MIS clients have the use of a fourth-generation programming language and actively use that language to produce their own information.

- Clients are, with the guidance of MIS, encouraged to design and develop their own systems and to write and maintain their own programs (written, of course, in a fourth-generation programming language).

- Clients increasingly accept responsibility for the operation of their production systems.

This definition of DBMS success is not fantasy. Reaching the ultimate goal will take time, patience and money, but it is attainable. The technology is either available or coming on-stream; the real issue is that of people. If MIS is not only to realize its real potential, but perhaps more importantly, survive, the time to recognize and begin to attack these nontechnical issues is now.

Simply stating that the technology has reached, or will soon reach, the required state of evolution to make all this happen begs the critical requirement to build the strong staff (both in MIS and the client areas) to make it all happen. This is, as it always has been in MIS, a severe problem. It does,

however, fall under the heading of the political, emotional and managerial problems — not the technical.

The preliminary step must be to gain the support of the organization's senior management for at least the concept of building the DBMS environment. Because of the high cost associated with the development of the DBMS environment, MIS must consider all the salient issues involved to present a cogent argument (based upon business, not technical, needs and benefits) to the organization's senior staff.

To a great degree, the success of this effort is tied to the amount of time and thought devoted to the preliminary work and the quality of the initial presentation made to senior management.

The potential benefits to the organization so outweigh the associated DBMS costs, if the process is correctly managed, that there is no reason to attempt to ignore or distant those costs in the beginning. What it will cost to do it right is what it will cost. Given the conditions of management commitment, a strong DBMS and qualified, dedicated staff, success can be assured; MIS management should be willing to stand up and say so.

Willingness of senior management

There is another facet of the DBMS issue that is important. Whether MIS management can do anything to help things in this area depends upon the particular organization. This issue is that of the willingness of senior management to understand at least the potential that is offered the organization by the DBMS.

This should not be on a technical level, but senior management should accept the responsibility to at least try to grasp the concept and to appreciate the potential.

Clearly, the issues are not likely to be considered and acknowledged unless there is a strong and concerted effort within the organization to make the data base an effective management tool. The ultimate success of the DBMS is dependent upon the leadership of the effort.

Next: The leader's role in a successful DBMS effort.

Murray is director of management information services for Rayovac Corp., Madison, Wis., and author of Management Information Systems as a Corporate Resource, published by Dow Jones-Irwin.

Machine credentials vs. native programming skills



HUMAN CONNECTION

Jack Stone

Even though the vast majority of DP centers hire only those professionals with hardware- and software-specific credentials, I surely don't agree with the practice. It is clear to me that, for example, a programming slot should be filled first on the basis of a candidate's native programming skills. Related machine experience is well down on my list of priorities.

In the case of the operations manager position in the mainframe installation, the situation is even more obvious. I would select the candidate with the strongest management potential, regardless of which mainframe is included in his background. But in this imperfect world, the hiring policies are not set as I think they should be, and the way hiring is going, they probably never will be.

The end result? Many good people are being overlooked as operations manager material, as attested to by this letter to me from Ron Ogle in Kitchener, Ontario:

"In reference to your column, 'Initiative, Not

Academics, the Key to Growth" [CW, July 11, 1983], I feel compelled to comment on the contrasts between the situation of your respondent and myself.

"First of all, let me say that I do agree with the overall message of the [July 11] column, that hard work and the application of the three I's of business life — initiative, industry and interest — are extremely important. In most cases, when in concert with a high learning ability and strong intellectual capabilities, they are more significant than formal post-secondary school education.

"I, too, started at the bottom as an operator trainee after beating out over 100 other applicants for the job. I progressed to shift leader within a year (three IBM mainframes), then worked for Honeywell, Inc. and NCR Corp. (six years each), after which I spent three years with a major NCR user. One gains a great deal of knowledge about hardware and software while employed by a manufacturer. I have been in operations management since 1970.

"Several years ago, I had an in-depth psychological evaluation and received the following comments: 'Strong organizational skills, high level of technical competence, superior intellectual capability, high knowledge of management practices, innovative in solving problems, learning ability superior to 98% of supervisors.' . . .

"In my most recent position, I was responsible for one of NCR's larger virtual multiprocessor mainframes, along with two other virtual mainframes at each end of the country. All three main-

frames were linked [by] data communications. My responsibilities included Sysgens, system software maintenance, problem definition and resolution, operations-oriented third-party software selection, hardware selection, system performance, tuning and capacity planning and system administration.

"In spite of my capabilities and experience, I am now unemployed and have been for a while. By the time you get this letter, I do hope to be employed, but in all likelihood, I will be out of [the DP profession]. Although I have searched long and hard for an operations job and identified many that match my managerial skills, the openings are not with NCR users, and no operations center is willing to take a chance on someone without hardware-specific experience. They seem to be satisfied with hiring someone whose skills are inferior to mine, as long as the hardware knowledge requirement is met.

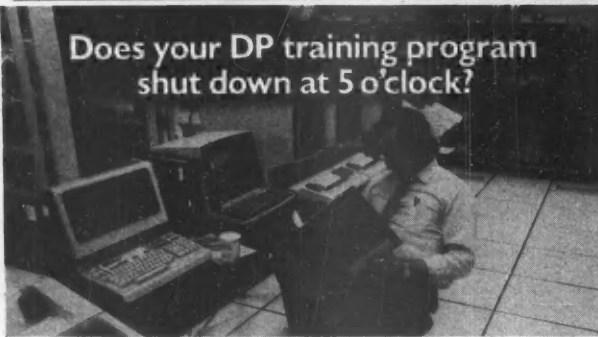
"I don't know if DP will miss me, but I will definitely miss DP. I'm obviously disappointed that the industry appears to be ready to lose me after all these years. It has been fun, frustrating and, in spite of the many 'all-nighters,' it has been rewarding.

"To your respondent, I wish him luck. But come to think of it, luck shouldn't have anything to do with the operations career."

Letters to Stone should be addressed to him at P.O. Box 33699, Washington, D.C. 20033.

Stone is an independent management consultant, educator and writer, specializing in DP human communications and personnel development, based in Washington, D.C.

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VIEWPOINT

Why did Ecom fail? Unrealistic forecasts, unmet requirements



READER'S PLATFORM

Walter E. Ulrich

The U.S. Postal Service's (USPS) experiment in electronic mail is coming to an end. The USPS is looking for a buyer for its Electronic Computer-Originated Mail (Ecom) hardware. Ecom, by every measure, has been an utter failure. What happened and why?

From 1976 to 1978, studies undertaken by the Postal Service indicated there would be an important market for electronic-originated mail. The objectivity of some studies may have been tainted by the strong pro-electronic mail position of postal management. Bias has no place in market research and may be one reason why volume forecasts were unrealistic.

Computers generate a lot of correspondence. Some of it is time-sensitive, and the senders want to attract the recipients' immediate attention.

Dunning letters are one example. The studies described the requirements for a new time-sensitive class of mail that would speed letters from a company's computer into the first mail stream. Unfortunately, the system the Postal Service designed in 1980 did not meet all the requirements specified by the studies.

Contract awarded

In January 1981, a contract was awarded for the development of Ecom. After negotiations with the Postal Service, the system delivered was even less than the already limited one the USPS had specified. Some of the companies that had endorsed the original concept were never able to make use of the final product. Messages were printed with black ink on white paper.

On January 4, 1982, Ecom was introduced. Ecom quickly got the reputation for being electronic junk mail. Ecom failed because of questionable market research, inferior service design and overoptimistic market forecasts.

When you read this article, Federal Express Co. in Memphis may have already announced another new electronic mail service. According to published reports, this new service will offer electronic coast-to-coast document delivery in two hours. Report-

edly, pickup and delivery by Federal Express' highly touted courier force is included.

Fred Smith, Federal Express chairman, is the visionary who identified the latent demand for reliable, overnight delivery services. Market research tells him that people put documents in Courier Paks. He already sees his company as being in the communications business. What is more logical as a next step than electronic mail?

Federal Express is a consummate marketing company and conducts market research early and often. Federal Express misses the mark occasionally (remember Hotel Pak?), but its record of marketing and promotion is the envy of most companies.

The electronic delivery service's design is superior. Group IV-type facsimile machines will provide copy quality nearly equivalent to that of an office copier. Pictures, graphs and signatures will be no problem. And the courier force will ensure delivery when it absolutely, positively has to get there today.

Federal Express expects to transmit 1.5 billion documents in 1990, according to Federal

Communications Commission filings. Facsimile has always been an electronic mail stepchild, and the forecast appears optimistic. On the other hand, the Office of Technology Assessment estimates 19 billion pieces of electronic mail in the same year. It is certainly conceivable that a company with the service, quality and credibility of Federal Express could achieve that level of penetration.

Market potential exists

The market for electronic mail is doubling every year. The introduction and aggressive marketing of the right products and services will blow the market wide open. The long-term success of the major communications and computer service suppliers will depend upon how quickly and successfully they stake out market share. Competition will ensure that customers have a wide range of options at a fair price.

What about the USPS? The most important thing the post office can do is to ensure that it has the best physical delivery system possible. For a generation at least, the bulk of the population will get their mail in physical (rather than virtual) mailboxes.

Electronic messages must get to people who aren't subscribers. The USPS should provide ready access to all electronic mail vendors and provide physical delivery conveniently, cheaply and reliably.

Ulrich is president of Walter E. Ulrich Consulting in Houston, a management and technology consulting firm specializing in computers, communications and office automation.



SOFTWARE & SERVICES



Software shows' time yet to come

Can the software industry support a large trade show of its own? Indications from the two major new software shows of 1984 are that it can't, at least not yet.

First the good news: The Information Management Exposition & Conference for Software (Info/Software), a first-year show held in Chicago this month, drew more than 8,400 people. That is more than had been predicted by the show's promoters, the Cahners Exposition Group. Over 130 vendors exhibited, and most have reserved booth space for the 1985 Info/Software, according to

See **SHOWS** page 58

Unix 5.2 out for PE superminis

Firm first major player to support Unix version

OCEANPORT, N.J. — Perkin-Elmer Corp. has become the first major minicomputer vendor to announce a fully supported version of the Unix System V Release 2 (5.2) operating system. The vendor has also announced a number of optional packages that run under the new operating system.

Scheduled for October availability, Xelos, a derivative of Unix System V, runs on PE's Series 3200 family of superminicomputers. The release incorporates all features of the recently announced Unix 5.2 [CW, Jan. 23] and several proprietary PE enhancements, a spokesman said.

The enhancements include Menumaker, a user interface that can be used to create menus that customize the operation of Xelos-based application systems, and the Documenter's Workbench, a set of text processing tools, formatting macros and line drawing macros that can be used to produce documentation during program development.

Xelos provides all standard features of Unix System V, including multiuser, multi-

tasking facilities with job control, a hierarchical file system with support for flexible access protection and shared files and record locking. C and Fortran 77 compilers, a Series 3200 assembler and a symbolic debugger are included in the operating system.

Prices for Xelos range from \$1,500 for an eight-user license on PE's entry-level Model 3205 to \$30,000 for 65 or more users on the high-end 3250XP supermini.

The optional applications announced today by PE include Supercomp-Twenty, a spreadsheet package from Access Technology, Inc.; Mark of the Unicorn, Inc.'s Finalword and Visicorp's Visiword word processing packages; Unify Corp.'s Unify relational data base management system (DBMS); and Ryan-MacFarland, Inc.'s RM/Cobol.

Unify is said to employ an integrated design that exploits the features of Unix disk management by performing direct I/O to files. Data access speed is optimized by a variety of linking mechanisms, the PE

See **PE** page 60

■ Interlink Computer Sciences, Inc. has unveiled a communications link between IBM mainframes and Decnet nodes/**52**

■ Management Science America, Inc. has unbundled its Peachlink software and will sell it as a separate product/**52**

■ Comshare, Inc. and Cortex Corp. were two of only a handful of vendors who made product announcements at the recent Info/Software show/**54**

■ Sakman Software Co. has announced five Cobol productivity tools for Burroughs Corp. computers/**55**

INSIDE

Systems Software/**55**
Productivity Aids/**56**
Application Packages/**56**
DBMS/**59**
Languages/**59**

SOFTLINE/GARY GULDEN and ROBERT RECK

CSF technique can apply to team management, too

The critical success factors (CSF) process is quickly becoming known as a high-quality, interview-based system design technique. Traditionally, the CSF process has been used with managers to create a management or decision support system. Now, however, Index Systems, Inc. has developed four new uses for the CSF technique that strengthens its usefulness.

The CSF process is usually recognized as a valuable method for determining information system priorities and other information that is useful in MIS planning.

The CSF process was first articulated by Dr. John F. Rockart of the MIT Sloan School of Management. Originally, Dr. Rockart envisioned using CSFs with a single executive. The philosophy of the approach is that if an executive articulates objectives and the essential things that must go right to make the objectives happen (CSFs), then the important areas for information support are the measures that track performance, help analyze or model critical elements of these CSFs.

More recently, Rockart and Index have extended the process of identifying management support systems to entire teams of managers with four new uses for the CSF process:

■ Focusing the information presented

in an organization's current management report (or reporting) portfolio.

■ Identifying, analyzing and supporting the definition of new business functions.

■ Overhauling the methods and procedures of a business or organization.

■ Supporting business (strategic and tactical) planning.

An organization can reap significant benefits from any one of these uses. However, taken together, these four new applications of the CSF process, along with the two conventional uses, offer a powerful basis for improving the effectiveness of managers.

The first new use for CSFs is to focus and tune up current management re-

See **CSF** page 60

Gulden is a vice-president and Rock a principal at Index Systems, Inc., a consulting firm in Cambridge, Mass.

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SOFTWARE & SERVICES

Communications link ties Decnet nodes to IBM MVS

FREEMONT, Calif. — Interlink Computer Sciences, Inc. has introduced an IBM user-initiated software communications link to Digital Equipment Corp. Decnet nodes for IBM MVS operating system users.

IBM MVS/Decnet Gateway reportedly enables IBM MVS batch jobs and interactive TSO users to send informa-

tion to and retrieve information from Decnet nodes.

The vendor's IBM user-initiated communications software, called IFT, coupled to the Decnet user-initiated capability, called DFT, provides bidirectional information transfer.

Users on the IBM side of an integrated system can access DEC files using either

TSO/ISPF (menu-driven screens), a TSO command processor or batch, the vendor said.

Additionally, IBM users can access DEC files without having to learn DEC command language, and DEC users can access IBM data sets without having to learn IBM JCL.

The product reportedly

combines an intelligent front-end network processor linked to the IBM system via a high-speed data channel, along with IBM host-resident software developed by the vendor.

The Gateway product, consisting of the network controller and IBM host-resident software, is priced from \$85,000, including one user-

initiated link — either the Decnet-to-IBM DFT link or the IBM-to-Decnet IFT link. The price of the additional link needed for bidirectional communications is \$22,000, while the batch software option is priced at \$8,000.

Interlink Computer Sciences can be reached through Suite 203, 39055 Hastings St., Fremont, Calif. 94538.

MSA to sell Peachlink separately

ATLANTA — Management Science America, Inc. (MSA) has announced that it plans to market its Peachlink micro-to-mainframe communications package this fall as a separate product.

Currently Peachlink is packaged as part of MSA's Executive Peachpak office productivity series, which includes spreadsheet, word processing and graphics applications.

Peachlink is compatible through a universal interface with other micro applications, including Visicorp's Visicalc, Ashton-Tate's Dbase II, Lotus Development Corp.'s 1-2-3 and any package containing Software Arts, Inc.'s Document Interchange Format standard, according to MSA.

Additionally, MSA plans to market Peachlink to mainframe systems houses that are not necessarily using MSA mainframe applications software, since Peachlink's software automatically uploads and downloads data into the applications' own native file format.

Transferring info

Peachlink provides two different methods for transferring information. With screen transfer, the micro accesses any on-line mainframe screen for partial or whole transfer, according to need.

The second method is direct data base sharing, in which the micro requests the mainframe to ship designated files in one request. The user is not required to requeue downloaded files for micro display or for uploading to the mainframe, the spokesman said.

Pricing of the communications software is not yet available, according to the vendor spokesman.

But, according to company officials, bulk purchases will be priced in the neighborhood of \$1,000 each.

MSA is located at 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

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SOFTWARE & SERVICES

Manufacturing, data entry, MRP systems bow at AMS Conference's product highlights include offerings from Martin Marietta, Boeing, Uniq

By John Gallant
CW Staff

CHICAGO — Martin Marietta Data Systems, Inc. unveiled the latest offering in what it called a computer-integrated manufacturing system at the Advanced Manufacturing Systems (AMS) conference here recently.

Dubbed Modular Applications System (MAS)-Financials, the system is a collection of packages designed to handle accounting, sales, procurement and inventory management, according to a spokesman. It includes eight integrated modules, which can be used separately, for

general ledger, accounts payable and receivable, customer order processing, inventory management, fixed assets and depreciation, sales history and purchase order and receiving.

MAS-Financials is currently available on Hewlett-Packard Co.'s HP 3000 minicom-

puters, the spokesman said, and will be offered in coming months for IBM's 4300 series and Digital Equipment Corp.'s VAX-11 series. The system will be marketed as part of Martin Marietta's MAS family of software and can be integrated with the company's MAS-Personnel,

MAS-Manufacturing and MAS-Payroll products.

The spokesman said the MAS-Financial modules for the HP 3000 are priced between \$6,000 and \$12,000. More information can be obtained from Martin Marietta Data Systems, 6303 Ivy Lane, Greenbelt, Md. 20770.

Micro data entry

Also at the AMS conference, Boeing Computer Services Co. introduced its Datamanager data entry system for IBM Personal Computers and Personal Computer XT's under Microsoft, Inc.'s MS-DOS operating system. A spokesman said the product is designed for the creation and use of interactive, screen-oriented data entry systems for distributed data processing networks.

Used as a front-end system, the spokesman said, Datamanager provides an operator interface that allows for the creation of transaction files for use on the micro or for transmission to a mini-computer or mainframe. Applications for the system are said to include order entry, insurance claim filing and other data collection activities. The system provides up to 64 edits for data validity and for restructuring data according to required formats.

The complete Datamanager system, including the screen design model, is priced at \$700 per copy from Boeing Computer Services, 7980 Gallows Court, Vienna, Va. 22180.

Modular system

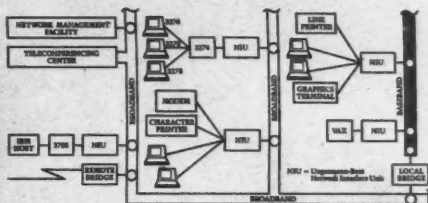
Uniq Digital Technologies announced its Spider II Manufacturing Resource Planning (MRP) System, which a spokesman described as a modular system of integrated manufacturing and accounting packages. The system is designed for use with the Unix System V Release II operating system on Digital Equipment Corp.'s VAX-11 superminicomputers.

Spider II supports a variety of functions, including inventory control, material requirements planning, custom order processing, standard product costing, job costing and shop floor control. In addition, the system reportedly offers word processing, financial modeling in conjunction with the company's Unicalq spreadsheet, computer-to-computer communications and electronic mail capabilities.

The full Spider II manufacturing and accounting system is priced at \$70,000, the spokesman said. Uniq Digital Technologies is located at 28 S. Water St., Batavia, Ill. 60510.

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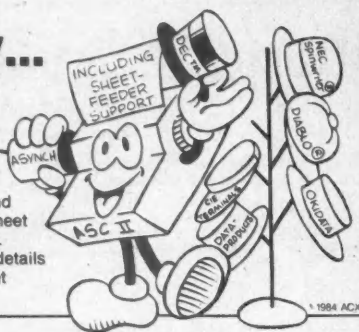
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Comshare, Cortex share bulk of product debuts

By Paul Gillin
CW Staff

CHICAGO — Only a few new products were unveiled at the Information Management Exposition & Conference for Software (Info/Software) here recently as vendors apparently held off in anticipation of the National Computer Conference to be held next month in Las Vegas.

Comshare, Inc. unveiled an IBM Personal Computer XT-based personnel record keeping and reporting system called Profiles/PC. The product is said to be functionally equivalent to a mainframe personnel system, but

is geared toward companies or divisions with less than 2,000 employees. The Profiles/PC data base includes personnel, salary, job, organization, benefits and other data modules, a spokesman said. Additional modules can be added to handle specialized functions.

Profiles/PC produces more than 90 standard reports and can be used to generate customized reports via menus and fill-in-the-blanks screens. Interfaces can be provided to popular mainframe human resource packages. Users can also access Comshare's remote computing services for data consolidation and backup. The base price of Profiles/PC is \$5,985 plus installation and maintenance. An introductory offer of a \$1,000 discount is available before June 30.

Comshare also announced a new release of its System W decision support system that includes a fill-in-the-blanks capability for building models. Called Model-by-Example, the feature guides the user through model building visually. As many as 15 commands can be combined into a single step.

The other enhancement to System W is the addition of Datman, an integrated relational data manager. The feature allows users to handle numerical, textual and date data, make full screen data selections and queries and perform basic data management functions. System W runs under IBM's VM/CMS, MVS/TSO and PC-DOS operating systems at prices ranging from \$55,000 to \$143,000.

Comshare also announced Microseek Plus, a micro-mainframe communications package that allows an IBM Personal Computer or Personal Computer XT to link to a mainframe as an asynchronous terminal or as an IBM 3270 terminal. It includes file transfer, asynchronous and IBM 3278 emulation, a set of prepackaged logon sequences for automatic connection to host computers and the ability to automate repetitive tasks. Microseek Plus costs \$7,000, including mainframe software and diskettes for five micros. Additional diskettes are \$200 per copy. Comshare is located at 3001 S. State St., Ann Arbor, Mich. 48106.

Cortex Corp. announced Version 2.0 of its application generator, the Factory, for Digital Equipment Corp. VAX-11 processors. It contains a DEC RMS interface that supports sequential and indexed file handling and other VAX-11 applications.

Factory users can access common data elements from other existing RMS applications. Previously, RMS files had to be extracted for use in Factory applications. The Factory also includes a menu-driven guidance system.

Additional modules are available to speed up runtime, allow Factory-generated applications to run on DEC PDP-11 or Professional 350 computers and to enable the user to run applications on VAX-11s not used for applications development.

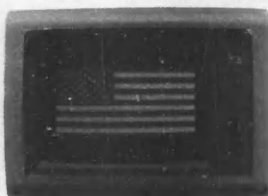
Version 2.0 of Factory costs from \$10,000 to \$25,000, depending on the VAX-11 model used.

Cortex is located at 55 William St., Wellesley, Mass. 02181.



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With the Forte-PJ™ 3278/79 Emulator/Adapter Board, your IBM PC™ or compatible system bats 1000 from both sides of the plate. You gain the speed and power of a coaxial cable-connected IBM 3278 display terminal while retaining all the functions of the Personal Computer. A single keyboard command moves you back and forth between DOS and terminal mode.

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and pie charts, histograms and conceptual drawings at your finger tips, not to mention foreign language fonts, scientific notation and even your own custom-designed characters.

Whether you're working in color or monochrome, you can use PC spreadsheet programs and other packaged software to work with current data from your IBM host. Forte's automatic file transfer utility allows you to send, receive and store host files without ever leaving terminal emulation mode.

Forte provides all the hardware and software you need to emulate any full-function 3278 or

3279 terminal. Installation is a snap: no host hardware or software modifications are necessary and only one slot is required.



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*SAS/GRAPH is a registered trademark of SAS

SOFTWARE & SERVICES

Sakman equips Burroughs

MADISON, Wis. — Sakman Software Co. has introduced five new Cobol programmer productivity tools for Burroughs Corp.'s 1000 to 4000 series computers.

The File Maintenance Program Generator (FMPG) reportedly generates structured programs for file maintenance. It requires users to provide parameters to the generator that allow the generated program to perform update functions. The Fix Program Generator (FIXPG) can be used as a testing and debugging utility for programs, a program generator for once-and-for-all type user requests and a program generator for mass updates. It reportedly creates Cobol programs that are able to select records from a file and update or delete

them as necessary.

The Profile Program Generator (PROPG) can be used as a testing and debugging utility or as a program generator for once-and-for-all type user requests. The Totalling Program Generator (TOTPG) can be used as a testing and debugging utility for the programmer or as a program generator of once-and-for-all type user requests. The Matching Program Generator (MPG) generates structured programs for matching, merging and selection-type problems.

MPG is priced at \$800, TOTPG at \$400, FIXPG at \$1,900, PROPG at \$600 and FMPG at \$2,100.

Sakman Software is located at 1205 Loruth Terr., Madison, Wis. 53711.

SYSTEMS SOFTWARE

COMPUTING CAPABILITIES CORP.

Radar enhancement

Computing Capabilities Corp. has announced enhancements to Radar, its terminal network monitor that reportedly enable it to monitor any application running on a Hewlett-Packard Co. HP 3000 minicomputer.

Radar enhancements reportedly permit monitoring of applications using any programming language or terminal handler, including those using fourth-generation languages. The product enables HP 3000 users to measure actual throughput and response times on their on-line applications, a spokesman said.

Radar sells for \$4,500.

Computing Capabilities, Suite 122, 465-A Fairchild Drive, Mountain View, Calif. 94043.

DYLAHOR

DYL-280 II

Dylakor has introduced a version of its English language file and information management system, DYL-280 II, for IBM DOS operating systems.

DYL-280 II includes a customized letter writer for volume correspondence, a report writer for simple or complex reports and a utility facility to handle routine maintenance tasks, a spokesman said. As an information handler, it is said to offer a large number of sort capabilities.

The system is said to have the flexibility of having logic either automatically controlled on I/O files or user-controlled, using the READ and/or WRITE command. Full support of Cobol copy members or books and/or in-stream Cobol definitions are provided, the spokesman said.

DYL-280 II is priced at \$15,000 and may be leased for \$240/mo on a five-year lease.

Dylakor, 17418 Chatsworth St., P.O. Box 3010, Granada Hills, Calif. 91344.

CAMBRIDGE SYSTEMS GROUP, INC.

ACF2 Release 4.0.0

Cambridge Systems Group, Inc. has announced Release 4.0.0 of its software access control program for the IBM MVS environment.

Release 4.0.0 of Access Control Fa-

cility 2 (ACF2) reportedly will offer enhanced security and streamlined installation and implementation. It provides extended CICS security facilities, while reportedly minimizing ACF2 validation and storage overhead, the vendor said.

Full screen sign-on support is provided. Multiple Region Option support is enhanced and there are new ACF command menus. ACF2 was developed by SKK, Inc. of Rosemont, Ill. The program costs \$33,000.

Cambridge Systems Group, 24275 Elise, Los Altos Hills, Calif. 94022.

B I MOYLE ASSOCIATES, INC. BIMCNSOL

B I Moyle Associates, Inc. has announced BIMCNSOL, a package that is said to permit IBM DOS/VSE operating system users to use IBM 3270 CRT terminals under IBM's CICS as alternate- or remote-system consoles.

According to a spokesman, the system allows console messages to be displayed and console commands to be entered from CRT terminals. The package is available in a display-only version and in a full display and command input version. The full command version provides operators with the ability to control the DOS/VSE system from multiple remote locations, and it permits users to respond to their own system messages and use normal system status inquiry commands from their own terminals.

The display-only version allows review of messages previously displayed on the system console in sequence, by partition and by search argument. The display-only version of BIMCNSOL is priced at \$880 for a permanent license and it can be leased for \$440/year or \$44/mo. The full command version costs \$2,000 for permanent license and can be leased for \$1,000/year or \$100/mo.

B I Moyle Associates, 5788 Lincoln Drive, Minneapolis, Minn. 55436.

MACRO 4, INC. Tubes Version 1.3

Macro 4, Inc. has announced Tubes Version 1.3, said to support multiple-CPU installations. Connecting the Tubes virtual machine on each machine via channel-to-channel adaptor or a point-to-point bisynchronous line, the product allows a user to connect to any system on any remote CPU listed in his Tubes menu screen.

Tubes is for use in IBM VM shops.

Continued on page 56

Source code control is only one step in software configuration management.

Softool's Change and Configuration Control (CCCSM) takes you all the way to full configuration control!

CCC automates: Management of changes and configurations, control over who makes what type of changes and where, tracking of trouble reports, reconstruction of previous versions, management reports, archiving, and all the remaining "steps" to total configuration control.

CCC is interactive and friendly.

It supports all programming languages, and comes with on-line tutorials.

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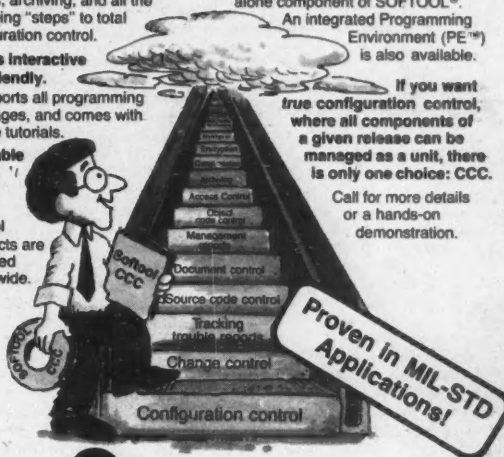
CCC is supported on the DEC VAX, DG MV, Gould S.E.L., Honeywell 6000 (Level 66 and DPS 8), HP 9000, and IBM 370, 30XX and 43XX computers.

There is more. CCC is a stand-alone component of SOFTOOLSM.

An integrated Programming Environment (PESM) is also available.

If you want true configuration control, where all components of a given release can be managed as a unit, there is only one choice: CCC.

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VMTAPE

SOFTWARE & SERVICES

Continued from page 55

the vendor said, adding that the new version is compatible with all earlier releases. A BRDCAST command allows a Tubes operator to broadcast to any user group. The Hardcopy facility enables users to direct a hard copy of any screen display to the VM system printer, the vendor said.

In addition, Tubes will now automatically start the logical devices associated with all or selected program function keys when a menu is first invoked, the vendor said.

Tubes Version 1.3 leases for approximately \$200/mo.

Macro 4, Millbrook Plaza, Mt. Freedom, N.J. 07970.

PRODUCTIVITY AIDS

COMPUTER ASSOCIATES INTERNATIONAL, INC.

CA-Optimizer

Computer Associates International, Inc. has announced an enhancement to its programming productivity and optimization tool, called CA-Optimizer. The new feature reportedly allows IBM VM/CMS operating system programmers to compile and optimize Cobol code either under VM/CMS alone or in conjunction with IBM DOS/VSE or OS/MVS operating systems.

CA-Optimizer provides a specially enhanced source listing that gives

programmers detailed information about the program in one concise listing, the vendor said. It includes three facilities — Optimizer, Analyzer and Detector — which aid in coding, debugging, testing, quality assurance and performance.

When used in the combined OS/MVS and VM/CMS environment, or the VM/CMS environment alone, CA-Optimizer allows compile and optimization of Cobol programs, reducing the size of the object deck, providing a greatly enhanced source listing and speeding the execution of the Cobol object program under MVS, the vendor said.

A perpetual license for DOS/VSE sites, with or without VM, is priced at \$17,500. The price for OS/MVS sites, with or without VM, is \$42,500, the vendor said.

Computer Associates International, 125 Jericho Tpk., Jericho, N.Y. 11753.

LINK DATA SYSTEMS

Program Generator; Link PC

Link Data Systems recently announced two products for use on the IBM System/34 and 36 and the IBM Personal Computer.

Program Generator and Link PC reportedly are designed to permit a non-data-processing individual to select information from host computer files and translate them for use on the IBM Personal Computer. The method of translation selected will

optionally allow the user to transfer data to spreadsheet packages such as Lotus Development Corp.'s 1-2-3, or to be used in user-written application programs, according to the spokesman.

No data processing experience is needed to operate the products, the spokesman said. Other features reportedly include systems security, the ability to translate packed data for use on the IBM Personal Computer, the ability to sort the output files in ascending or descending order and multiple file support.

Program Generator is priced at \$395, and Link PC is priced at \$95, according to a spokesman for the vendor.

Link Data Systems, P.O. Box 37, Ambler, Pa. 19002.

APPLICATION PACKAGES

BAKCO DATA, INC.

Optimum Warehouse Distribution Application enhancements

Bakco Data, Inc. has announced a number of enhancements, including full lot control, for its Optimum Warehouse Distribution Application.

The Lot Control Subsystem reportedly enables the applications to set up individual lots with expiration dates for each lot. Full inventory control for each lot can be maintained so

that consolidated inventory management reports can be produced on demand, a spokesman said.

The program operates on the Hewlett-Packard Co. HP 3000 minicomputer using HP's Image data base management system. The packages utilize a fourth-generation language, report writer and screen handler.

The various modules are priced from \$9,800 to \$22,700, according to the vendor.

Bakco Data, Suite 190, 85 W. Algonquin Road, Arlington Heights, Ill. 60005.

HORIZON SOFTWARE SYSTEMS, INC.

Horizon Wordprocessing Release 3.4

Horizon Software Systems, Inc. has introduced Release 3.4 of its Unix-based Horizon Wordprocessing. The release includes an expanded menu of help files and a broadened range of printer commands.

The help files are designed to offer step-by-step guidance to common text-manipulation tasks, a spokesman said. Through an EXPLAIN command, the user has access to 41 categories that lead through progressively more specific steps to accomplish tasks or explain relationships between commands and sets.

The expanded printer commands encompass numerous printing attributes now available on many printers, the spokesman said. The user may modify or add to the command index file for each printer.

The Horizon product has been ported to more than 35 computer systems, ranging from microcomputers to mainframes and utilizing all versions of the Unix operating system and look-alikes, the spokesman said.

Prices range from \$595 to \$2,395 depending on the system used.

Horizon Software Systems, Suite 4821, China Basin Building, 185 Berry St., San Francisco, Calif. 94107.

TANDEM COMPUTERS, INC.

T-Text

Tandem Computers, Inc. has announced the addition of word processing capability for its Nonstop distributed processing superminicomputer systems.

T-Text, an option for Tandem's 6530 terminals, consists of special editing keys, a word processing controller board for the terminal and host software. It reportedly eliminates the need to learn complicated sequences of control characters. T-Text enables users to create, edit and print documents by pressing editing, function and object selection keys, the vendor said.

Documents created using T-Text can be distributed via the vendor's electronic mail to any combination of users, either locally or through a worldwide network, the vendor said.

T-Text is said to provide menus for creating, formatting and printing documents, or for listing documents and printing status. Other menus enable users to set edit and print profiles to an automatic default.

The T-Text terminal is available factory-installed or as a field upgrade. The terminal package, factory-installed, is priced at \$400. Pricing for host software is \$1,000 per processor for a one-time license fee.

Tandem Computers, 19333 Vallecito Pkwy., Cupertino, Calif. 95014.

See PACKAGES page 58

Why use a CONSCO Accounting Information System to produce your General Ledger?

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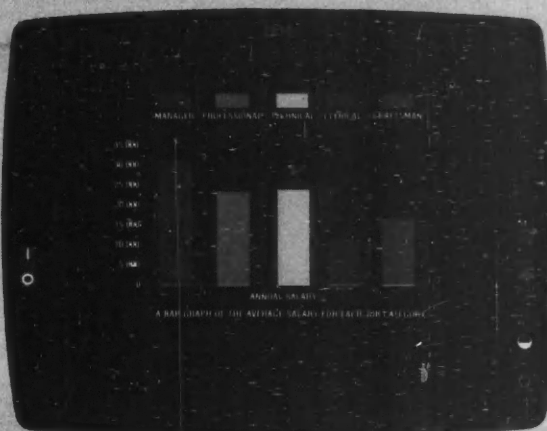
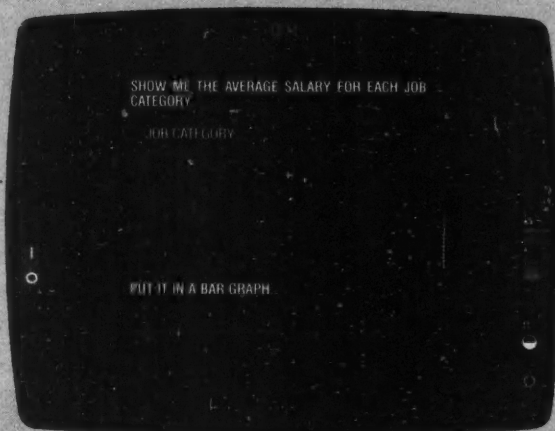
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SOFTWARE & SERVICES

SHOWS from page 51

show management.

Now the bad news: Like Softcon, another first-year exposition, held in February in New Orleans, Info/Software failed to prove anything.

In fact, the atmosphere at Info/Software was curiously negative.

Comments from vendors and users paralleled many of those put forth by attendees at Softcon. Vendors generally agreed that the quality of the contacts they made was high. However, many groused about what they perceived as a disappointing turnout. Asked to rate the show on a one to 10 scale, most vendors rated it a six or lower.

Users were more encouraged by the placid atmosphere of the show, which they said was an improvement over the maniacal environment of a Comdex or a National Computer Conference.

Most were delighted with the opportunity to peruse products at their leisure. But nearly all of the users admitted surprise at the sparse attendance.

Both shows frustrating

Both shows were frustrating in that they failed to provide the blockbuster surprise that sponsors had hoped for.

True, trade shows take time to evolve. But the concept of a software-only show is nothing new. Softcon and Info/Software were heavily promoted by their respective sponsors, yet neither offered the definitive proof of viability that the industry has been expecting.

As one Applied Data Research, Inc. marketing representative put it, "I still don't think people understand what software is."

His statement was borne out by one look at the exposition floor. The vendors who seemed to draw the largest crowds were those like Lotus Development Corp., Ashton-Tate and Multimate Corp. that offer end-user-type software for microcomputers.

Storm clouds on horizon

Ironically, just as the software industry has begun to arouse some trade show interest in 1984, storm clouds have begun to appear.

One vendor at Info/Software suggested that the micro software industry is just waiting for an excuse to scuttle trade show exhibits. That excuse may come this November, when Lotus will sit out the mammoth Comdex show.

At Info/Software, IBM was a glaring no-show. It pulled out in late May because of "budgetary reasons" and because some planned products were not yet ready for market, according to a Cahners Exposition Group spokesman.

Half-hearted boost

Cahners has given Info/Software a halfhearted boost by scheduling a second show next year in Chicago in February.

A spokesman justified the timing by explaining that it fills the void between Comdex/Fall and Comdex/Spring and doesn't compete with any other expositions. However, a trade show held in arctic temperatures is not likely to present breakthrough potential.

Perhaps low-volume shows like Info/Software and Softcon will be the best the software industry has to offer in the coming years.

PACKAGES from page 56**DIALOGUE, INC.**
DSS Graphics

Dialogue, Inc. has introduced DSS Graphics software, a package that reportedly combines graphics technology with decision support system capabilities. DSS Graphics gives users the ability to sort, select and analyze data and distill it into chart form.

DSS Graphics is said to be composed of custom graphics and business graphics systems. The custom graphics feature provides users with the ability to construct corporate logos, line and polygon drawings and structures, segments and metafiles. The business graphics feature allows users to create line, pie, bar, time and text charts.

DSS Graphics reportedly allows the tracking of a product's sales, financial operating statistics or production performance measures. It runs on all Prime Computer, Inc. models; the Digital Equipment Corp. Decsystem-20 and VAX-11/730, 750 and 780; and all IBM computers that run IBM's TSO or CMS.

DSS Graphics is priced at \$5,000 until Aug. 30, at which time the price will double.

Dialogue, 19 Rector St., New York, N.Y. 10006.

SYDNEY DATAPRODUCTS, INC.
DSM Link

Sydney Dataproducts, Inc. has enhanced its Decision Sheet Modeling (DSM) software with the addition of DSM Link. DSM Link reportedly permits communications between the

DSM software running on a mainframe and several microcomputer-based spreadsheets such as Lotus Development Corp.'s 1-2-3 and VisiCorp's Visicalc.

DSM Link reportedly allows consolidated modeling scenarios to be developed and stored on a corporate mainframe, while 'what-if' and divisional analysis can continue to be developed in a micro-based environment.

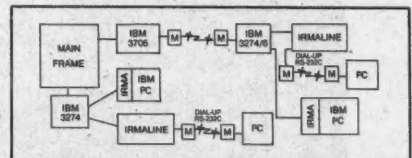
DSM with DSM Link is priced at \$35,000. DSM runs on the Digital Equipment Corp. VAX-11 and PDP-11 models, the Hewlett-Packard Co. HP 3000, the Datapoint Corp. 8600 series and IBM mainframes under VM/CMS or MVS/TSO, according to the vendor.

Sydney Development, 600-1385 W. 8th Ave., Vancouver, B.C., Canada V6H 3V9.

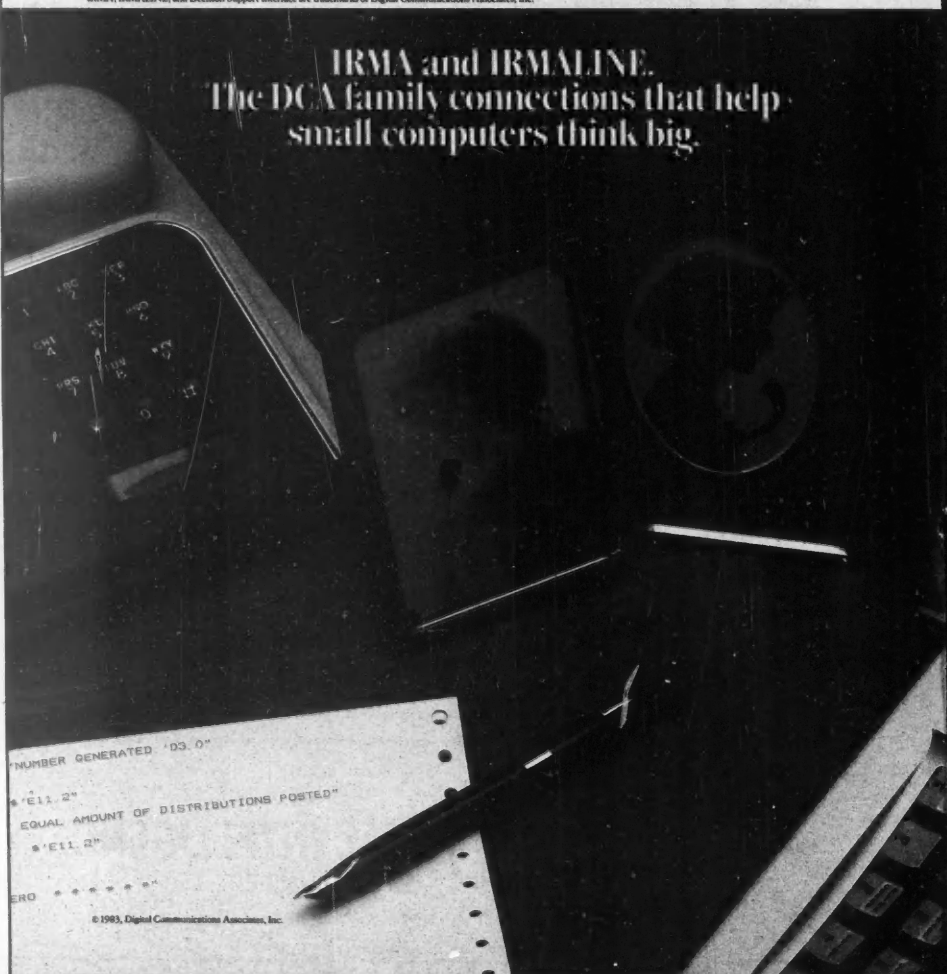
Here are two beautiful ways to get small computers on line with the mainframe quickly, easily and economically—yours from DCA, home of the industry's first coaxial cable links between small computers and IBM 3270 networks.

IRMA[®] is the Decision Support Interface[®] that gets IBM Personal Computers and IBM PC XT's into the 3270 mainstream via direct attachment to 3274 or 3276 controllers.

IRMA, IRMALINE, and Decision Support Interface are trademarks of Digital Communications Associates, Inc.



IRMA and IRMALINE.
The DCA family connections that help small computers think big.



SOFTWARE & SERVICES

SOFTWARE INTERNATIONAL CORP.**Version 6 General Ledger**

Software International Corp. has announced Version 6 of its data-base-oriented General Ledger & Financial Reporting application software package, which now includes a real-time option.

The real-time option enables users to switch on demand from a production mode to real time in order to do immediate updating of accounts, to enter and post journal entries and to perform maintenance procedures, the vendor said.

Version 6 is available for IBM OS- and DOS-based mainframes and System/34 and 38 minicomputers.

Version 6 is priced from \$70,000 to \$80,000 for the OS and DOS mainframes and at approximately

\$35,000 for the minicomputers.

Software International, 1 Tech Drive, Andover, Mass. 01810.

PRIME COMPUTER, INC.**Prime 50 series software**

Prime Computer, Inc. has announced that five software packages from three vendors have been converted for use on Prime 50 series superminicomputers.

Diversified Data Collection Systems' shop floor control package reportedly automates shop floor data collection using bar-code technology and application software. It is priced at \$75,000.

Aftac, Inc. converted its Pro-III package for use with Prime systems. The package is said to integrate materials requirements planning and wholesale distribution products

fully. It is priced from \$12,000 to \$75,000, depending on configuration.

Conley, Canitano and Associates, Inc. has converted three financial packages developed by MCBA, Inc. to run on the Prime 50. These include the Future/50 General Ledger, Accounts Payable and Accounts Receivable. The packages range in price from \$10,500 to \$12,500.

Prime Computer, Prime Park, Natick, Mass. 01760.

DATA BASE MANAGEMENT SERVICES**HOLLAND SYSTEMS CORP.****Logical Database Design**

Holland Systems Corp. has an-

nounced a software product that can be used for designing data bases using IBM or plug-compatible mainframes under IBM's TSO and MVS operating systems.

Logical Database Design (LDD) is said to provide software, procedural methodology and educational and professional support. LDD can be used on a project, division or corporate level to design stable, shareable data bases, according to the vendor.

Systems analysts use LDD to provide the operational specifications for the project. Data analysts define the required data elements, develop a logical data model and then map it to the company's overall information and data plans, the vendor said.

Users provide their views on how data elements will need to be structured for each user/system interaction. Data base analysts use the LDD results to design the physical data bases, and data base administrators review LDD results to ensure consistency with overall information and data plans.

LDD is compatible with the vendor's Strategic Systems Planning, an information resource management product for strategic information and data planning. It can also be used with other top-down information planning tools.

The product reportedly reduces subsequent data base maintenance and redesign by focusing on data elements, data relationships, "user views" and overall data planning during project specifications.

LDD runs on IBM or plug-compatible mainframes under TSO and IBM's MVS operating system. It is priced at \$45,000, according to the vendor spokesman.

Holland Systems, S-903, 3131 S. State St., Ann Arbor, Mich. 48105.

UNIFY CORP.**Unify on Digital Equipment Corp. hardware**

Unify Corp. has announced a contract with Digital Equipment Corp. to supply Unify's Unix-based relational data base management system (DBMS) on DEC's Professional, Micro/PDP-11, Micro VAX I and VAX-11/750 and 11/780 processors.

The operating systems that can run Unify's relational DBMS include Venture Com, Inc.'s Venix and DEC's Ultrix.

Prices start at \$1,495 on low-end DEC systems and at \$14,500 on high-end systems, the spokesman said.

Unify, 9570 S.W. Barbur Blvd., Portland, Ore. 97219.

LANGUAGES**RAPITECH SYSTEMS, INC.****Fortrix-C**

Rapitech Systems, Inc. has announced Fortrix-C, which converts Fortran files and programs to C files and programs.

The package is said to include an integer converter, character transformer, string converter, space allocator and string parser. Fortrix converts Fortran flow control statements to equivalent C instructions at a rate of 600 line/min, the vendor said.

Fortrix-C costs \$2,500.

Rapitech Systems, 565 Fifth Ave., New York, N.Y. 10017.

See LANG page 60

IRMALINE does the same for remote IBM PCs, IBM PC XT's, Apple Lisas and DEC Rainbows, among others, with just a local phone call to a nearby 3270 controller.

Both can go to work literally minutes out of the box. Both provide mainframe data access, selection and storage, and data communication back to the mainframe.

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Digital Communications Associates, Inc.

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SOFTWARE & SERVICES

LANG from page 59**THE DESTEK GROUP**
Destek C

The Destek Group has announced a C cross-compiler for creating Motorola, Inc. 68000 code on Data General Corp.'s Eclipse MV/4000 computers under DG's AOS(MV) operating system.

The Destek C compiler includes a compiler, assembler, linker, loader and runtime library. It can be used to produce read-only memory code or disk-based programs. The compiler is a multipass optimizing compiler and includes the full C language, a spokesman said.

The price of the Destek C cross-compiler is \$9,000.

Destek Group, 830 E. Evelyn Ave., Sunnyvale, Calif. 94086.

PE from page 51

spokesman said.

A set of nonprocedural development tools are provided, including facilities for interactive data entry, ad hoc queries, report writing and data base updating, according to the spokesman. In addition, loading and unloading of data bases to and from system files allows easy interchange with other systems.

Unify will be available in the fall, with prices starting at \$750 for the PE 7350 desktop system and \$1,495 for the entry-level Model 3205 supermini.

RM/Cobol is an implementation of the Ansi 1974 standard and was developed for developing and executing single-user or multiuser applications on mini or desktop systems. Interactive features include screen han-

dling, on-line debugging and comprehensive error messages.

The product includes all standard Cobol file access methods, including access to multikeyed, indexed files, the spokesman said.

For interprocess coordination, record-level data locking is provided. There is also an interface to the Unify DBMS.

RM/Cobol licenses start at \$650 for the PE 7350 and \$750 for the 3205.

The Supercomp-Twenty spreadsheet ranges in price from \$2,000 on the 3205 to \$4,800 on the 3250XP.

Finalword prices range from \$1,750 to \$4,300, and Visiword prices range from \$1,750 to \$4,100.

Information is available from PE's Data Systems Group, which is located at 2 Crescent Place, Oceanport, N.J. 07757.

CSF from page 51

ports. If the CSFs and their attendant measures are known, then available information can be added to current reports to give some critical measures and thus enhance the value of those reports. Alternatively, the CSFs can be used to cut out irrelevant data from or even to eliminate current reports. This use can be an interim step while management support systems are being developed to meet the full needs of a management team.

In an energy resources company, the CSF process was used by senior managers with the goal of developing management support systems. The process ended with the definition of three major systems. However, the managers sought immediate results for the current report portfolio to cut down the flow of paper in the business, to focus management attention on critical areas prior to the availability of the new systems and to help solve the "data rich, information poor" problem.

The measures supporting the CSFs were identified and were used as the basis for adding and deleting data from many of the reports, combining several major reports and eliminating several others. The results were immediate productivity improvement and cost savings, as well as other desired achievements.

The second new application uses the CSF framework as the basis for identifying a new organizational element or business function, for analyzing the functional role within the business and how it interacts with other business units and for developing support from managers for the new organization or function.

In one business, a quality assurance function was being created. However, the function's role and required actions for success were unclear. In a brainstorming session, the manager of the new function defined the ideal mission, objectives and CSFs and realized that lateral managers needed to be involved in and responsible for quality assurance.

CSFs, once identified, can also be used as a basis for overhauling the methods and procedures of a business and focusing on where they are helping or inhibiting the achievement of objectives. Additionally, once critical measures are known, the business processes that support these measures or management information can be streamlined.

For example, a company with market-driven CSFs (such as "know the competition" or "get close to the customer"), but with a strong set of product development and sales controls, could use the results of the process as the basis for removing some of the controls no longer appropriate for the new thrust and orientation of the business.

Finally, a fourth use for CSFs is focusing a team of managers on the mission, objectives and CSFs of an entire organization. Management consensus regarding these factors is crucial at the start of any information system or planning project.

In one telecommunications firm, the planning process showed that the mission and objectives for the firm were not shared by the senior executives. The CSF process was used. The result was a consensus by the executives on a mission that was considerably broader than the managers' original view and a consistent and shared set of objectives and CSFs.

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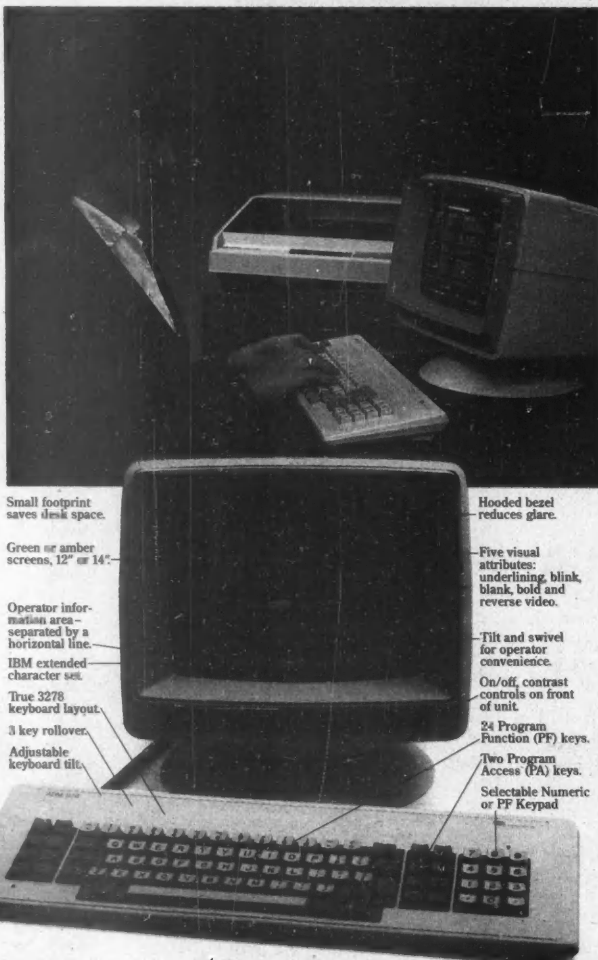
The ADM 1178 terminals can handle computer transmissions up to 19,200 baud without handshaking. They feature five video attributes (underlining, blink, blank, bold and reverse video), the IBM extended character set, four cursor modes (block or underline, blinking or steady), and 24 Program Function (PF) keys and two Program Access (PA) keys.

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IN DEPTH



Japan and France know where their computer industries are heading. In the U.S., government actions are confusing and conflicting. A national computer policy would focus government and industry on a single identifiable outcome.

A United States of information

The industry and the nation need a cohesive policy

By Ben G. Matley

The absence of a cohesive U.S. national computer policy (NCP) places the U.S. computer industry at a disadvantage relative to foreign competitors. This lack of a cohesive policy has produced conflicting and inconsistent domestic laws and practices on privacy and computer crime. Industry leaders continue to call for more direct government participation.

The U.S. maintains computer policy positions, of course. But legislation, litigation and executive orders are made piecemeal, one issue at a time. The result: an imbroglio of unanticipated actions and unexpected effects, generally to the disadvantage of the computer industry.

Focusing government and industry

A comprehensive NCP study holds the possibility of developing a cohesive policy because competing interests would not be acted upon in isolation from one another. Furthermore, an NCP plan would focus the efforts of government and industry upon an identifiable outcome in the same way that the National Aeronautics and Space Administration (Nasa) provides coordination and direction as well as funding in space

research. NCP studies by other nations demonstrate that Nasa's success is achievable in the computer arena.

Several nations have published position papers regarding the place and importance of computers in national life. The NCP studies from Japan and France are particularly important because of their measurable impact upon the U.S. computer industry. In the case of Japan, at least, there is no need to convince the reader that the U.S. computer industry has found a worthy and capable challenger in computer research and development.

The evidence in the case of France may be less apparent, but that is because France's NCP study dates only from 1978, whereas Japan's dates from 1972. Not only has Japan's NCP plan had more years in which to come to fruition, Japan has implemented the plan more aggressively than France. An examination of the origins and effects of those two NCP plans offer some surprises.

Japan's meteoric rise in computer R&D and in chips was not due to luck. Its success cannot be attributed to predatory designs, entrepreneurial activities or industry investment practices. Japan's rise to prominence was a direct result of

IN DEPTH/UNITED STATES OF INFORMATION

pursuing the plans laid out in the NCP study published in 1972.

The study was prepared by a think-tank organization, the Japan Computer Usage Development Institute (Masuda, Y., The Information Society, Institute of the Information Society, Tokyo, 1980.) The study recommended that Japan prepare for a leadership position as an information society by the year 2000. Titled "The Plan for an Information Soci-

ety — A National Goal Toward the Year 2000," the NCP study identified nine specific areas for computer development projects, with an investment of \$66 billion from 1972 to 1985. Such bold plans on that relatively short scale of time would require a domestic computer industry.

Domestic chip capability

Of course, a domestic computer industry would require a domestic chip capability. Several events followed in a

fairly logical sequence:

- Joint government-industry-sponsored computer projects were planned.

- The government invested \$250 million to accelerate the acquisition of chip technology, mostly from the U.S.

- Domestic markets were protected from competition in computers and communications so that a domestic industry could quickly emerge.

- A national goal was set to build the first fifth-gener-

ation non-von Neumann machine.

- Developments in artificial intelligence and robotics were pressed.

The effects of Japan's NCP plans and its successes became evident long before 1985, though many American observers perceived the situation as resulting from international business competition in computers. In fact, the nature of competition in computers and communications was rapidly

changed from one of business competitors to one of sovereign competitors. Any doubt of that change can be dispelled by examining France's NCP study.

France's NCP plans derive from a premise clearly stated in its NCP study of 1978: Sovereign survival demands sovereign control of computers and communications networks, termed "telematics." Sovereign control of telematics was said to be possible only if there existed a domestic computer industry, free of foreign influence. The NCP study, translated into the *The Computerization of Society* (MIT Press, 1980) was submitted as a report to the president of France. It dealt at length with matters of computers and communications as sovereign interests.

IBM as threat

The need for a domestic computer industry led to a lengthy discussion of IBM as a threat to the sovereignty's interests. The threat applied not only to IBM France but to IBM internationally as well because of the company's expected dominance in international data transmission. A full seven pages of the NCP study's 141 pages were devoted to what was perceived as the overwhelming IBM challenge. And the study offered a remedy: the imposition of national computer standards.

Subsequent actions by France were consistent with the findings of the NCP study:

- An interest was acquired in CII Honeywell-Bull.

- Two thousand French homes were experimentally connected to telematics networks.

- Non-IBM protocol standards were defined.

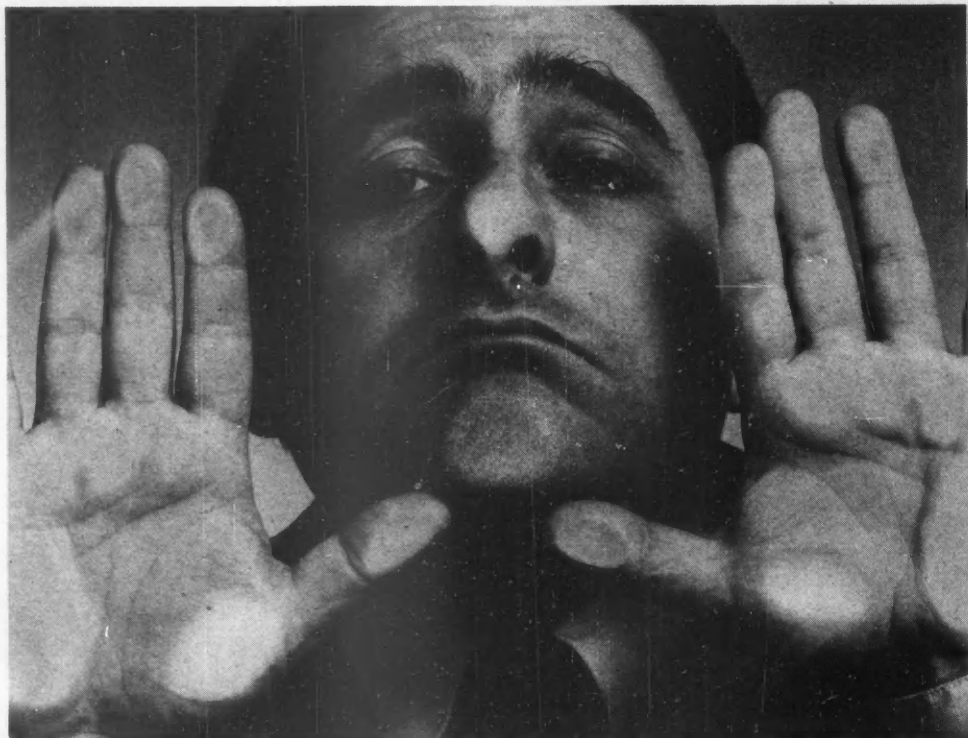
- An attempt was made to have the Common Market countries adopt similar protocol standards.

- Protectionist trade practices were initiated in computers, communications and data.

- Treaties were sought on international data flow.

While it does not necessarily follow that European antitrust charges against IBM relate to France's NCP, France raised a vigorous voice in promoting that action as being in the interests of all European Economic Community (EEC) members.

Whatever the motivation of European nations in that action or the perceptions of France, the EEC antitrust actions against IBM are having a telling effect, as indicated by IBM's request for U.S. government help in resolving the matter. Once again, a knowledge of NCP studies reveals the trend toward a computer industry increasingly composed of sovereign competitors and not solely business competitors.



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Since the U.S. has not made a comprehensive NCP study, it has found no sovereign role — either as partner to industry or as competitor to sovereignties. Various U.S. governmental entities have not been consistent in computer-related actions, either intra-agency or inter-agency.

At the international level, a series of on-again, off-again embargoes of comput-

Ironically, numerous bills to ensure the privacy of computer criminals' records have passed over the years.

ers sold to the Soviet Union is said to have provided only a disservice to the U.S. computer industry.

At the same time, less stringent rules on computer trade with other nations provide a number of connections through which illegal computer shipments go to Iron Curtain countries.

Other computer crimes, of the domestic variety, are easily perpetrated (indeed, playfully perpetrated) with little risk of detection and apparently less risk of prosecution and prison sentences. The notion that something of value purloined (for example, CPU time or data in transit) presents a prosecutable criminal act seems to have been lost along the way in computer crimes. Jurists

have called for special laws to define computer-related crimes. A series of bills for that purpose failed in the U.S. Congress from 1979 to 1983.

Criminal privacy laws

Ironically, numerous bills to ensure the privacy of computer criminals' records have passed over the years. Criminal privacy laws outnumbered all other categories of privacy legislation. It seems a contradiction to re-

fer to "categories" of privacy legislation, when this usage refers to personal data privacy. Why not a personal data privacy bill that covers all personal data? Assuming that our society desires to preserve personal data privacy, then the type of personal data and the medium of storage would not seem to be the critical variables.

That omnibus approach to privacy legislation, however, failed when HR 1984 (aptly titled) was introduced in the

U.S. House of Representatives in 1975. Thereafter, privacy legislation was passed by category. Criminal data privacy was accounted for in authorizing legislation for the old Law Enforcement Assistance Administration and recently for the National Crime Information Center.

Financial data privacy was accounted for in authorizing legislation for the electronic funds transfer system over several years, in piecemeal fashion, until the

Federal Reserve reported that those privacy and reporting provisions soon were in conflict with one another. Adherence then became impossible. Medical data privacy, school data privacy and other special categories were similarly accounted for with special category legislation. A cohesive and comprehensive view of personal data privacy would seem in order.

Automation of work, and national policies affecting such, likewise reveal



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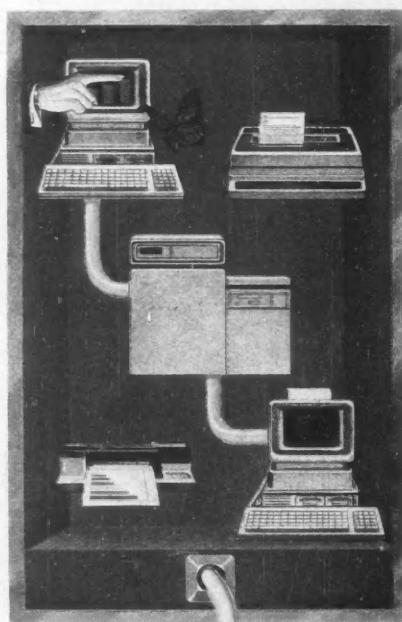
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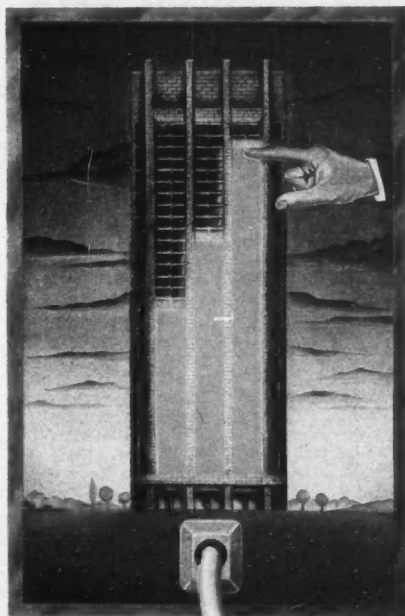
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competing and conflicting interests, each viewed one at a time. Full employment legislation dates back many years; automation certainly mitigates against full employment in specific sectors such as automobiles and general manufacturing. Unions are asking for a national policy on job security in the face of accelerating automation. The General Accounting Office (GAO) calls for a stronger federal presence in promoting automated manufacturing. Clearly, these are competing and conflicting interests, which are not best considered in isolation of one another.

The greatest concerns for the U.S. computer industry are only now being placed on the national agenda, notwithstanding the very weighty concerns considered to this point. Leaders of the U.S. computer indus-

The U.S., with no explicit position paper on national computer policy, is backing into a position on computer privacy that is exactly the same as that of Japan and France, which arrived at their respective positions directly by their policy studies.

try are beginning to call for relief for the industry from the effects of the actions of the sovereign competitors.

Changes in antitrust laws are said to be needed so that computer firms can pool their R&D efforts, thus competing better against Japan. Several firms have already formed a joint research organization and now wait to see whether the Federal Trade Commission will look the other way. And the National Science Foundation states that federal funding of super-

computer development is needed in the interest of national security.

On the societal side, civil libertarians express concerns reminiscent of the National Data Bank debates of the early 1960s over the fledgling National Driver Register and the proposed National ID card system. The latter is a supreme example of conflicts that arise when a single "problem" is attended to in isolation from competing and conflicting interests.

The proposed National ID system

is given as a solution to the problem of illegal aliens hired in place of citizen workers. The legislation would place heavy penalties upon employers who knowingly hire illegal aliens. Citizen workers would be given National ID cards; illegal aliens would not.

Yet years ago, a government privacy study specifically addressed this point and opposed a universal identifier. The study said: "American culture is rich in the belief that an individual can pull up stakes and make a fresh start, but a universally identified man might become a prisoner of his recorded past."

That report provided the foundation for the contents of the 1974 Privacy Act and the privacy acts of several states. And now, in 1983 and 1984, piecemeal legislation stands ready to violate a central tenet of that report.

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Conflicting interests surrounding computer trade, R&D, manufacture and use can be resolved with reason only by considering all their interrelationships.

It is most fascinating to observe that the U.S., with no explicit NCP position paper, is backing into a position on computer privacy that is exactly the same as that of Japan and France, which arrived at their respective positions directly by their NCP studies. That position, as derived from the Japanese NCP study, foresees a "Copernican turn in privacy," meaning that personal data privacy will vanish into centralized data banks on citizens.

The French study referred to the need for a "new right to access" personal data on all citizens. Of course, the first step to accomplish that Copernican turn and to make good that new right to access is to establish a national personal ID system.

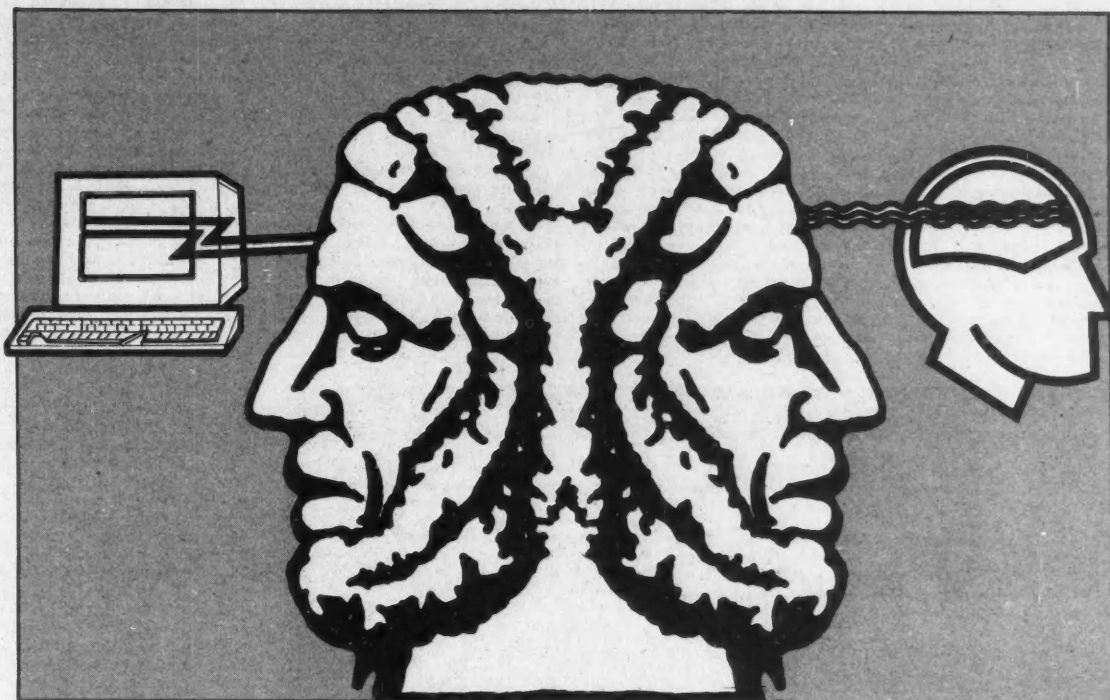
It is revealing to observe that the Congress defeated the National Data Bank funding bills in the early '60s out of concern about the amount of personal data that would be transmitted around the country in telecommunications networks not entirely secure, in addition to the concerns about national IDs. But a recent report from the GAO displayed a map of the U.S. showing the nationwide connections of only three federal telecommunications networks. The map appeared as the surface of a ball of string.

The way to resolve these conflicting interests surrounding computer trade, R&D, manufacture and use is to consider their interrelationships. A cohesive U.S. national policy is necessary if this country is to play a proper role as sovereign computer competitor and understand the effects of computer-related events upon the domestic society.

About the author

Ben G. Matley is a professor in the Department of Mathematics and Computer Science at Ventura College, Ventura, Calif. He is also a lecturer in computer science at West Coast University's Graduate School in Los Angeles.

IN DEPTH



Software's next dimension

By Forest Woody Horton Jr.

Product developers of artificial intelligence, expert systems and gateway software (for searching commercial data bases) are not thinking boldly enough.

Software exploits the power and versatility of machines. It not only helps us "do the thing right," it also helps us "do the thing well." But that still isn't enough. We must also learn to do the right thing.

That is where the next great advance in software — "knowledgeware" — comes in. Until now, we have programmed the user to exploit the machine. In the future, we must reverse the process — program the machine to exploit the potential of the mind.

If we consider the dual-faced image of Janus, the ancient Roman god of gates and doorways, software might be thought of as the left face, looking toward the machine. Knowledgeware might be visualized as the right face, looking toward the mind, or the brain.

Neither hardware nor software sprang full-blown onto the drawing boards as new product families. Each group of Information Age tools follows the classic product life cycle curve. Software, hardware and knowledgeware borrow ideas, component processes and component technologies — know-how from older generation products that matured, declined and even became obsolete.

Knowledgeware, in short, is gradually evolving from hardware, software and other roots and ideas. And as we move into a knowledgeware era, we will still need even more and

Until now, we have programmed the user to exploit the machine. In the future, we must reverse the process — program the machine to exploit the potential of the mind. That is knowledgeware.

IN DEPTH/SOFTWARE'S NEXT DIMENSION

better hardware and software, not less. But over a very long period, there is a melding of earlier stages into later ones — for example, transistor tube computer mainframes into chip technology-based mainframes.

Another phenomenon characteristic of technology life cycles might be called "secondary re-births." That is, even after a product or family of products matures and begins its decline, there are often one or more spinoffs (perhaps "spurts of new growth" is a more appropriate phrase), in which a new generation of products comes into being. For example, in the case of hardware, a new and exciting fifth generation of computers is springing up.

Hardware, unlike buggywhips, will never "die" or become obsolete, although experts may argue as to

whether the decline is relatively sharp or gradual — nor will traditional software disappear altogether. Just as many of the ideas, component processes and component technologies involved in hardware design, manufacturing and marketing were bootstrapped into software design and into manufacturing and marketing as well, so undoubtedly will software know-how be bootstrapped into knowledgeware products (for example, more humanlike command languages). The question is not whether the bootstrapping takes place, but which know-how, when, how much and how fast.

Hardware, software and knowledgeware operate, I believe, to satisfy different levels of spheres of human physiological and psychological needs.

Figure 1 juxtaposes human phys-

iological and psychological needs on the one hand with human information needed to meet those basic needs on the other. The way the two pyramids relate to one another can be illustrated with the lowest or most basic level: coping information is needed to help human beings satisfy their simplest biological needs. Coping information resources include both manual and automated information systems, counselors (family, religious, social, financial, legal and so on), educational and learning resources.

Abraham Maslow's pyramid model reinforces the notion that basic survival needs must be satisfied before the more materialistic, social and higher order spiritual needs can be addressed. The search for intellectual values and satisfaction, such as inner self-realization, must wait, ac-

cording to Maslow, until the substantial satisfaction of the lower order needs.

I believe it can be argued that hardware and software have helped us to move up from the lower order levels to the middle ones. But knowledgeware will be the key to allowing us to move up the pyramid even further to the higher levels.

Nearly all coping information resources have benefited from a wide variety of computer and telecommunications hardware and software. For example, emergency 911 services in most major cities are now computerized and tied into telecommunications networks. Computer-rated dispatching systems allow the call taker to identify the police or other emergency vehicle nearest the scene. The calls are checked against a geographical base file that verifies the legitimacy of the address.

Where video systems are coupled with such computer-based emergency service systems, additional screens can tell whether the nearest emergency vehicle is a one- or two-man car or whether it is equipped with life-saving equipment such as a respirator or burn treatment unit. Very substantial hardware and software backup is now commonplace for such emergency service systems, including systems on the order of the Modular Computer Systems, Inc. Modcomp 4 and IBM 370/158, with supporting operating, utility and application software packages.

Such computer-based applications directly support the need for coping and helping information resources. They also help us move up the pyramid from the first to the second level and, to a lesser extent, from the second to the third.

When we move up to level two, a higher order group of computer-based applications can be found, but still employing fairly commonplace hardware and software, albeit with better price/performance and more sophistication. For example, every local government, not to mention state and federal agencies, has several dozen different kinds of income security, health/medical and other entitlement programs. At the federal level, Social Security and Medicare are two obvious examples.

Each program depends on extensive information systems for efficient administration. Indeed, it has been argued that none of these large-transaction-volume programs could even exist today without those technologies.

I would argue that for the most part, this category of applications directly supports level two, helping information, in the Figure 1 schema — and, to a lesser extent, level three.

But what of hardware and software that begin to break the barrier between levels three and four? Here we begin to run into more difficulty, for the products and technologies are not advanced enough in design, nor are the potential applications of those products and technologies so obvious. Nevertheless, there are some examples.

For one, some of the newer on-line data base searching aids can be classified here. Here are some examples, picked because they illustrate the category, not necessarily because they are superior.

IBM's Intellect (developed by Artificial Intelligence Corp.) has been touted as a user (command) language that, in the company's words,

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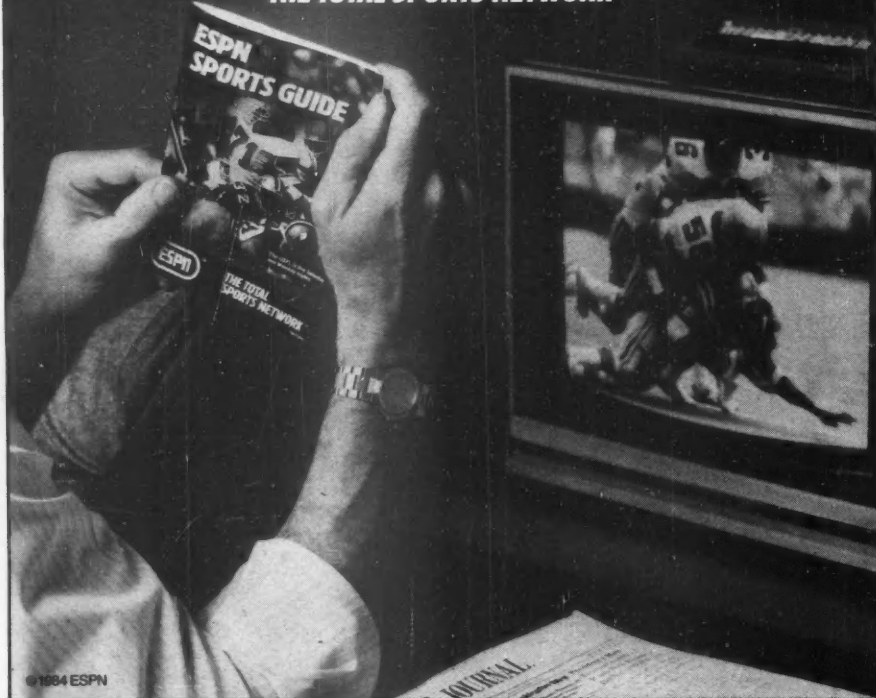
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IN DEPTH/SOFTWARE'S NEXT DIMENSION

"breaks through the barriers that limit access to computer-based data and lets you get the information you need for making informed decisions, and all with the normal English you use every day." The particular quality that moves this software product closer to the knowledgeware category is the ability to enhance the basic starting vocabulary with self-defined synonyms, terms used in personal data bases and industry- and application-specific terms. It can group certain data items, such as defining "New England" to mean the set of six specific states.

Knowledge Man is another example, offered by Micro Data Base Systems, Inc. Its promotional thrust is aimed to "outthink the competition." That is, it claims to offer greater capabilities in such areas as the maximum number of tables that are open at once, while storing and retrieving data, querying multiple tables with a single command, multilevel sort breaks and so on. In the spreadsheet area, the company claims the product can construct a cell in the worksheet that can extract data from independent tables, and the cell can be an entire program. In the screen construct area, the product can do format-at-a-time processing.

In the on-line searching arena, Menlo Corp.'s Insearch and Information Access Corp.'s Search Helper both deserve mention. The latter introduced the basic idea that a search could be set up in a public library environment much like a vending machine operation. That is, you put your dime or quarter in and out pops the candy bar (completed search, in our example). The former product has the virtue of treating material being worked on as if it were in a file folder and being able to "consult itself" without having to use print or other intermediary command tools, having once stored search results. In a manner of speaking, Insearch has the ability to translate between sophisticated and unsophisticated users.

We should also mention Dialog Information Services, Inc.'s Knowledge Index and Bibliographic Retrieval Services' After Dark. The former is command-driven, the later menu-driven. They both function as bridges between the big systems and such services as CompuServe and The Source.

But all of these level 3-to-level 4 transitional software product claimants have as their Achilles' heel the presumption that the user has a fairly sophisticated level of on-line searching knowledge, has already defined his problem, has some fairly good idea of what he wants and is already to a large extent computer-literate.

Instead, knowledgeware product designers must assume just the opposite: that the user is unsophisticated, has not thought out his problem well, if at all, and has little if any idea what information may exist to satisfy his requirements. The user may be not only computer-illiterate but also downright antagonistic toward machines.

A significant part of the problem is that we are tending to think of third-generation tools of the mind (knowledgeware) as simply the most modern state-of-the-art version of the same basic kind of software we were producing in the '60s and '70s. Some observers have called that genre of software products the

brute force variety. That is, the mindset of their designers was to shove tons and tons of data through a machine as input. And, on the output side, we would get still more tons of data, but of course refined, reorganized, reassembled and so forth.

In the '70s we began to wise up a little to that mindset (too much data, not enough information), and the concept of the management information system was born. Presumably we learned also to apply other relevant modern management concepts like management by exception.

Then on-line data bases and personal computers came along, and we were diverted to cope with how to educate larger and larger fractions of the general population to the efficacies of the machine. The excitement of on-line data bases diverted large portions of the scientific and

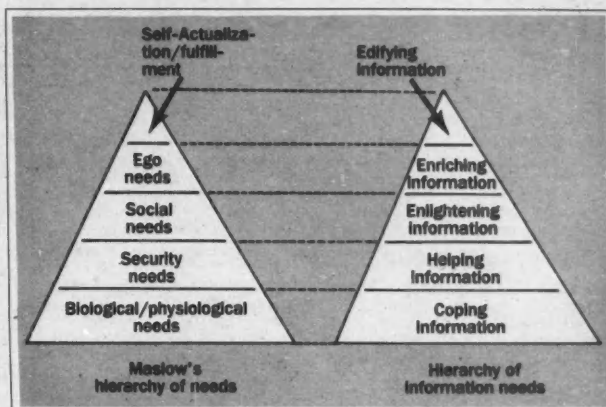


Figure 1. Hierarchy of needs and information

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technical information community to dealing with the problem of creating efficient automated indexing, storage, search and retrieval algorithms.

The verb "divert" is used deliberately here to underscore that while these important breakthroughs were taking place, somehow we seemed to have forgotten the mainstream information organization and management problems that were still with us and needed to be resolved. We paid a high price for that diversion of skilled manpower. While progress in micro software has indeed been spectacular, it has come at the expense of moving state-of-the-art knowledge forward for dealing with some very old information handling problems like indexing.

Automatic indexing is one area in which few breakthroughs have occurred in the last several decades.

Yet most experts seem to agree that if we are to capitalize on new hardware developments such as optical disk technology we must make greater strides to confront longstanding and fundamental information indexing and other information management problems.

Knowledgeware must implicitly herald a return to dealing with the basic information management challenges of both the past and the future. Notice I've said "information management," and not so much "management information." The cleverest software in the world will become increasingly inappropriate if it intends to fulfill "predetermined" information needs of users instead of helping them help themselves.

By contrast, the knowledgeware of tomorrow should not overwhelm us with an information architecture that dictates to us, "These are your critical information requirements." Instead, knowledgeware must say to the user, "My virtue is to help guide your searches wherever they may lead."

The 15 parameters listed in Figure 2 illuminate the similarities and differences between the three "wares." Current developmental efforts diverge from this model primarily in the first four areas on the list.

For example, most of the new software product announcements quickly get into data management, spreadsheet analysis, statistical presentation and the ease of performing various computational algorithms and functions. At the same time, these promotional materials stress the use of easy-to-use "plain English" languages. Of course, all of these features, along with mouses, windows and all the rest are useful, but they do not address the discovery and learning challenges at the heart of knowledgeware.

Instead, current software products simply capitalize on imaginative and versatile data, picture and image manipulation and display techniques and technologies (including the employment of a few darn good "tricks").

At the same time, one group of products, so-called gateway software, is making inroads into the challenges of searching on-line data bases (both internal and commercial), challenges that, once again, are not to be minimized. They are large in number and extremely difficult. Cross-data base searching, for example, is fast becoming a reality, with the newer "invisible" or "transparent" products that simplify and automate the oftentimes tedious and time-consuming identification, log-on, connect, use and log-off protocols.

The knowledge gateway system (KGS) to information access (CW, Dec. 5, 1983) is an example of yet another knowledgeware product that is still on the drawing boards but promises to become a reality in prototype stage before too long.

While nearly all expert systems being developed today (or already operational, such as Mycin) are built upon an existing body of knowledge in a particular field (chemistry, medicine, geology), there is yet another possibility for expert systems. They can help users to learn, discover and find out what information resources even exist, how they may be accessed and how they may be used effectively.

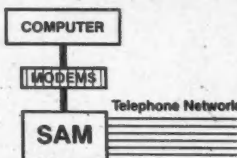
At one level, the KGS may be

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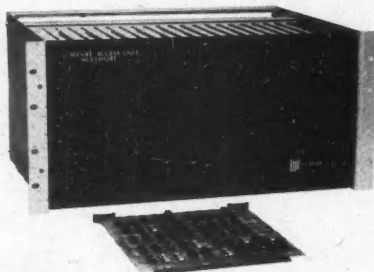
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IN DEPTH/SOFTWARE'S NEXT DIMENSION

| | Hardware (Stage 1) | Software (Stage 2) | Knowledgeware (Stage 3) |
|---|--|---|---|
| 1. Purpose/ function | Doing the thing right | Doing the thing well | Doing the right thing |
| 2. Role/function of machine | To mechanize, auto- mate, compute, etc. | To organize, pro- cess, simplify | To enhance the reasoning powers of the mind |
| 3. Role/function of user | To operate the machine | To work faster and harder | To work smarter |
| 4. Role/function of the brain | To harness machine's power | To utilize data and information- al output | To discover, to learn, to inquire |
| 5. Driving pro- cesses/tech- nologies | Silicon chip | Languages, graph- ics displays | Exploiting user creativity |
| 6. Designer | Electronics engineer | Computer systems analyst, program- mer | Knowledge engineer and architect |
| 7. Developer | Equipment manufacturer | Software developer | Mixed physical and social science in- terdisciplinary teams |
| 8. Illustrative products | Networks, main- frames, micros, minis | Operating systems, utility systems, application pkgs. | Customized problem- solving and decision- making algorithms |
| 9. Illustrative services | Computation, communication, data processing | Electronic spread- sheets, stat. rou- tines, report gener- ators, graphics | Enhanced infor- mation-seeking competence and skills |
| 10. Key knowl- edge and dis- ciplines | Mathematics, phys- ics, electronic engineering, com- puter science, photochemistry, etc. | Linguistics, lan- guages, system sciences, commu- nication arts, ergonomics, etc. | Cognitive psychol- ogy, epistemology, information science, artificial intel- ligence, problem- solving |
| 11. Commu- nication | Machine languages | Command languages | Verbal and non- verbal human languages |
| 12. Input | Electrical signals | Data | Information |
| 13. Output | Electrical signals | Information | Solved problems and made decisions, new knowledge |
| 14. Throughput | Electrical signals | Transactions | Hypotheses, models |
| 15. Memory | Magnetic tapes, disks, drums, op- tical fibers | Data bases and computer programs | Heuristic knowledge, expert experience |

Figure 2. Tools to help thinking

thought of as an expert system in which the "expert" is an interdisciplinary team of experts, and the data base is a repository of knowledge and wisdom that has been accumulated over the years by such professionals as reference librarians, educational and media experts and cognitive psychologists.

Unfortunately, to the best of this writer's knowledge, few other examples of knowledgeware prototype products exist. Perhaps they do exist, but as closely guarded corporate trade secrets until launch onto the market.

In the interest of conserving space and time, we will not address each of the 15 parameters in Figure 2 individually. There is plenty of room for argument in every one of the areas covered. I would urge the reader, particularly software product inventors and designers, to look at them both individually and collectively.

While it is perfectly understandable why software houses are pushing to bypass the intermediary on-line search community and reach out directly to the personal computer end user (the market will be 10,000-fold more profitable), knowledgeware products for the end user do not involve merely making searches invisible or transparent to the user. Those are certainly important and worthy goals, but shouldn't be re-

garded as the only, or necessarily most important, ones.

In addition to the product examples we offered earlier, in this area, all the following products have the potential to be transformed in future editions from purely stage 2 software products to stage 3 knowledgeware products: Sci-Mate (Institute for Scientific Information), Visilink and Data Kits (Visicorp/Data Research, Inc.), Microdisclosure (Disclosure, Inc.), and Dow Jones services such as the News/Retrieval service, Market Analyzer, Market Microscope, Market Manager and Investment Evaluator.

As end-user computer literacy gradually improves and spreads, can the thirst of users for more and more data, information and knowledge be far behind? If we try to prestructure answers for them with clever software instead of teaching them how to help themselves, we're going to be confronted with an even greater rebellion of the kind that we faced in the '70s, when central MIS computer center clients became so disenchanted with the service they were getting.

About the author

Forest Woody Horton Jr. is a Washington, D.C.-based consultant who specializes in information management.

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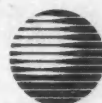
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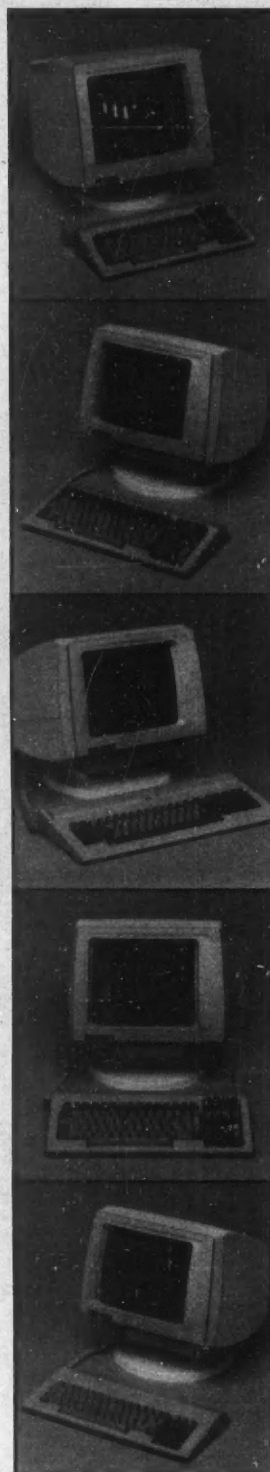
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IN DEPTH

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Where the jobs are

Demand for computer professionals rose dramatically in the past year. Both user and vendor companies are offering alternative career paths to attract and keep talented staff.

By Wayne D. Emigh

The first half of 1984 brought a sharp increase in demand for computer professionals in technical, marketing and management positions. Aggregate demand for January through May is up by 36% over the same period in 1983 and 48% over 1982.

Openings for software engineers and developers, particularly those with Unix and C language experience, increased by a dramatic 300%. At the same time, the need for programmer/analysts with a background in relational data bases has more than doubled. Programmers as well as analysts with a combination of micro, mainframe and mini experience are being sought by more than four times as many companies as in 1982, coincident with the rapid growth of in-house, microcomputer-supported distributive systems.

An experienced data processing executive today can aspire to the same opportunities in general business management as his peers in finance, engineering or sales. Employers consider ideal an MBA degree combined with undergraduate experience in accounting, finance, engineering or computer science.

Moreover, MIS executives can expect parity in compensation with other equivalent-level executive positions within their companies. In fact, according to the latest computer salary survey

IN DEPTH/WHERE THE JOBS ARE

conducted in 55 geographic areas by Source EDP, more than 240 top computing executives now earn in excess of \$100,000 annually.

As the economy improves, DP professionals are moving or being transferred more frequently. The proportion of people changing employers and relocating 50 miles or more fell from a prerecession level of 30% to approximately 16% during the recession. The rate has rebounded to 26% and continues to rise.

In some areas, reductions in the ratio of housing costs to overall income have helped. So has the resurgence of the financial services, banking and automobile industries, which now must staff up to make up for lost time in applying information systems to corporate needs.

The limited time available to many of these companies to fill their overdue staffing needs often forces them to recruit outside their immedi-

ate geographic areas. And as demand for their skills continues to rise, DP professionals feel more confident in their ability to relocate and succeed in a new area.

The Sunbelt still receives the most net in-migration of computer professionals in spite of the fact that the energy companies in those areas have not yet resumed their systems expansion and aggressive hiring of the late '70s and early '80s. Energy industry centers such as

Houston, Denver, Tulsa and Alberta have not yet returned to prerecession hiring levels.

The Midwest is experiencing a strong resurgence of demand for information systems staff. According to the California research firm SRI International, the heartland of the U.S. should create seven million new jobs by 1990, with a high proportion in the computing field. The Midwest is home to more than 300 of the top 1,000 compa-

nies in the country. The Cincinnati/Dayton area, in particular, is emerging as one of the leaders in the Midwestern economic revival, with the demand for computer professionals overall up 36% from last year.

Although California's Silicon Valley and Boston's Rte. 128 are still among the leading hardware/software technology centers and continue to spawn entrepreneurial start-up companies, Dallas and Austin, North Carolina's Research Triangle, Phoenix, Atlanta, Toronto and San Diego are also fast becoming high-tech strongholds. Firms in these areas are seeking people with specialized skills in communications, personal computer networking, data base and a wide variety of applications and systems software technology, along with the more usual general business and industry data processing disciplines.

Western Pennsylvania has lagged behind the rest of the nation in demand for computer specialists. The steel industry's weakness has affected other dependent industries. Pittsburgh, however, remains the third largest headquarters for Fortune 500 companies. Carnegie-Mellon University is a leader in robotics research and development, and there is a high demand throughout the Pittsburgh area for individuals skilled in C and Unix.

While geographic trends are significant, even more noteworthy are the number of new developments in technology that are behind two of the most significant trends to emerge in the past few years. These are the emergence of the personal computer within the business, industrial and military environments and the proliferation of software products for advanced-capability applications.

Many organizations are looking more to consultants and to outside proprietary software vendors for help. Software sales have quadrupled in just the last three years and are expected to reach more than \$10 billion this year. U.S. corporations bought 50% more software packages last year than in the previous year, accounting for 8% of the average current data processing budget, up from 6% in 1980.

Hardware vendors are realizing the need to provide more software products in order to promote the marketability of their hardware. Hewlett-Packard Co., as an example, has increased software research and development budgets fivefold (to \$38 million) in the past three years, while simultaneously acquiring three independent specialty software houses. In a variation on this trend, certain joint marketing agreements are being created, as

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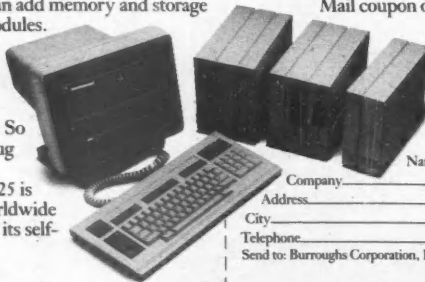
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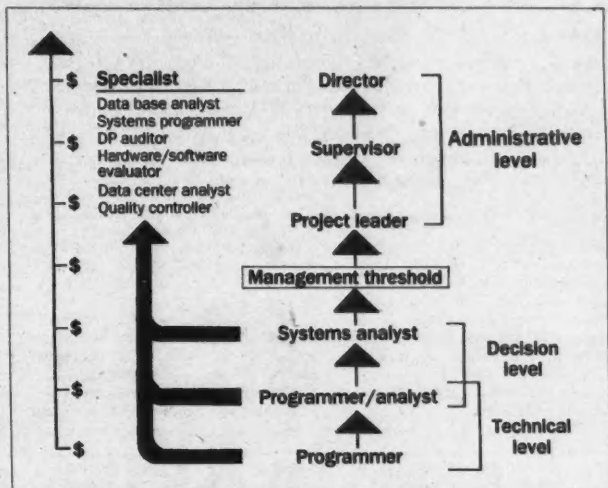
IN DEPTH/WHERE THE JOBS ARE

in the case of the recent compact between IBM and Comshare, Inc., involving the sales and implementation of decision support systems.

What this means to the computer professionals is greater and more diversified opportunity than ever before. Because of the demands for broader applications of both computer hardware and software, new career opportunities continue to develop, not only in the traditional end-user environments, but also at an even more rapid pace within the applications and systems software technology areas. Industry estimates indicate that today there are well over 3,000 independent software companies providing a variety of products to hardware vendors as well as to the end-user market.

An interesting phenomenon is occurring as part of the evolution of data base management software systems. The more advanced systems of today are finally able to perform with the sophistication and capability that were often proclaimed, but seldom delivered, in the early days when these systems first became commonplace.

Paradoxically, new application generators being implemented today are making it too easy for systems developers to design non-data-base-oriented applications through direct links to CICS-type conventional file systems. This trend, while not yet widespread, is becoming more commonplace as these generators gain a



Computer specialists are challenging the traditional salary and career barriers in the information systems environment.

greater foothold within the user environments. As a reflection of this development, Source EDP's recent survey of hiring found that the greater proportion of openings for data-base-oriented personnel are for technicians rather than managers.

The proliferation of microcomputers is the other half of the leading edge in technological trends. In 1975

there was virtually no commercial microcomputer market. By 1980, micros held 6% of the total \$29 billion of new hardware shipments in that year by U.S. manufacturers worldwide. Industry predictions are that in 1985 micros will compose 20% of a total \$63 billion market and by 1995 will dominate then projected sales of \$313 billion with a 55% mar-

ket share. If these predictions hold, then microcomputers will have achieved a market level of more than \$170 billion from a standing start, in only 20 years.

The majority of software products to support these systems are yet to be developed, yet software technology has come a long way in only a few short years. For example, AT&T has jumped into the fray with its six new 3B series computers. Each relies on the Unix operating system, which itself is rapidly receiving wide industry acceptance and is almost a de facto standard in some areas because of its flexibility and multiplexing capabilities. Coincidentally, in systems software, in multiuser networks and in high technology, the C language is gaining wide use.

As the personal computer has grown in acceptance within the business environment, it has, in turn, contributed to the erosion of use of outside time-sharing services and/or the traditional service bureau. Alternatively, those vendor organizations likely to have the most promising future are either those concentrating on aggressively expanding their library of marketable software products or computer utilities that have developed a major data base with broad market appeal and easy accessibility by customers.

The parallel trend toward greater in-house micro utilization is being driven by the relatively low cost, the attraction of personal and ready

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IN DEPTH/WHERE THE JOBS ARE

access, and the fact that many applications adapt well to these systems. Many micro users believe that these systems are actually more versatile and more cost-effective than other options. Within Source EDP, we're observing a trend toward more entry-level opportunities for individuals well trained in Basic on the IBM Personal Computer and to a lesser degree with other micros. It appears that these demands will increase with time.

Another persistent development in the computer field today is the establishment of the information center within the computer department of many larger companies. These centers serve a number of purposes which vary by company.

Some companies have established an executive systems group for the specific task of providing advice and

While demand for computer professionals continues on the upswing, opportunities at the entry level remain relatively limited. By itself, the technical or trade school education has little value as a door opener in today's job market. A college degree is often the minimum credential needed in order to break into the field.

training to users in the acquisition and implementation of small and/or personal computers. Other companies form applications development centers to interface between the user departments and the computer department's application development teams, as well as explore ways of increasing the productivity of programmer/analysts.

To keep pace with the advancement of computing technology and its applications, a number of new jobs are being developed. With the proliferation of new software and hardware products has come myriad opportunities for software designers and developers, software engineers, quality assurance analysts and implementation specialists, in a number

of areas.

In the user environments, a diversity of career paths is emerging, particularly at the specialist level, offering career growth and financial rewards heretofore available only at management levels. An example is Flying Tiger, the major Los Angeles-based transportation company, which has established the position of technical specialist.

Management Information Systems Director Lee Mitchell says, "This new position was created to provide an attractive career path for the senior person with highly developed technical skills who does not aspire to a management responsibility. This person assumes the role of internal consultant and enjoys a salary range comparable to certain management levels within the department."

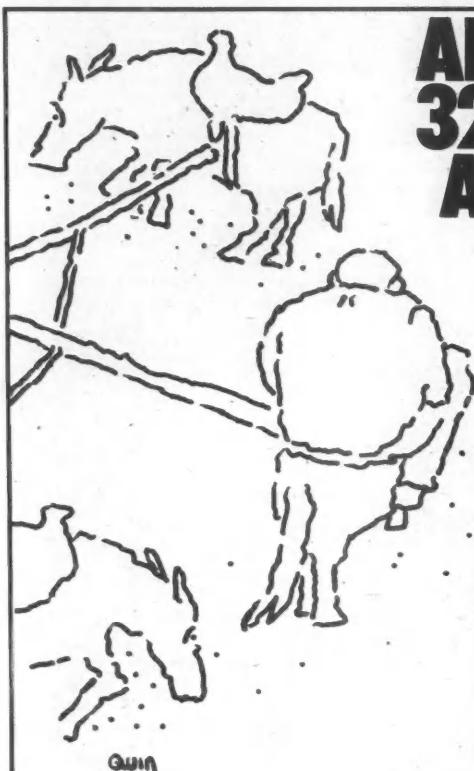
As at Flying Tiger, new hierarchies of responsibilities are evolving in most larger companies and include specialties ranging from systems programmer, DP auditor and data base specialist through quality assurance specialist, security analyst, hardware/software evaluator and data center analyst. Of course, each discipline may engender its own management hierarchy depending on size and importance within the company. The figure on ID/17 depicts alternative career paths which enable many specialists to circumvent the traditional limits of compensation and responsibility.

As batch-oriented environments become almost passe, employers are more regularly expressing a preference for people with on-line, data base and/or personal computer experience. Paradoxically, while demand for computer professionals continues on the upswing, opportunities at the entry level remain relatively limited. By itself, the technical or trade school education has little value as a door opener in today's job market. A college degree is often the minimum credential needed in order to break into the field. Academia is responding to this demand by developing curricula that answer the needs of the technologically oriented student as well as the individual focusing on a computer-oriented business career. Colleges and universities vary greatly in their offerings. One major Midwestern university's school of engineering offers a B.S. in computer engineering emphasizing true software physics and hardware engineering, while the college of arts and sciences is simultaneously conferring degrees in computer science. The latter curriculum stresses languages, data base management, structured systems design and computer-assisted business problem analysis.

Within the vendor ranks, the general product line sales representative is in higher demand than the specialized product representative. Also, since vendors' offerings include a greater array of turnkey, install-it-yourself or retail store products, the demand for traditional marketing support-oriented systems engineers has leveled off. Conversely, there is still a strong need for product implementers and trainers.

About the author

Wayne Emigh is vice-president and general manager of Source EDP in Mountain View, Calif. Prior to joining Source EDP in 1968 as manager of the Los Angeles branch, he was director of corporate information systems for Dart Industries.



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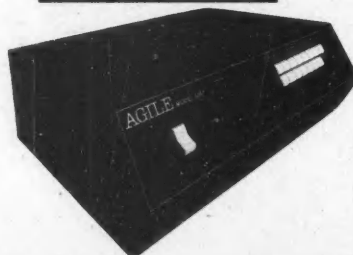
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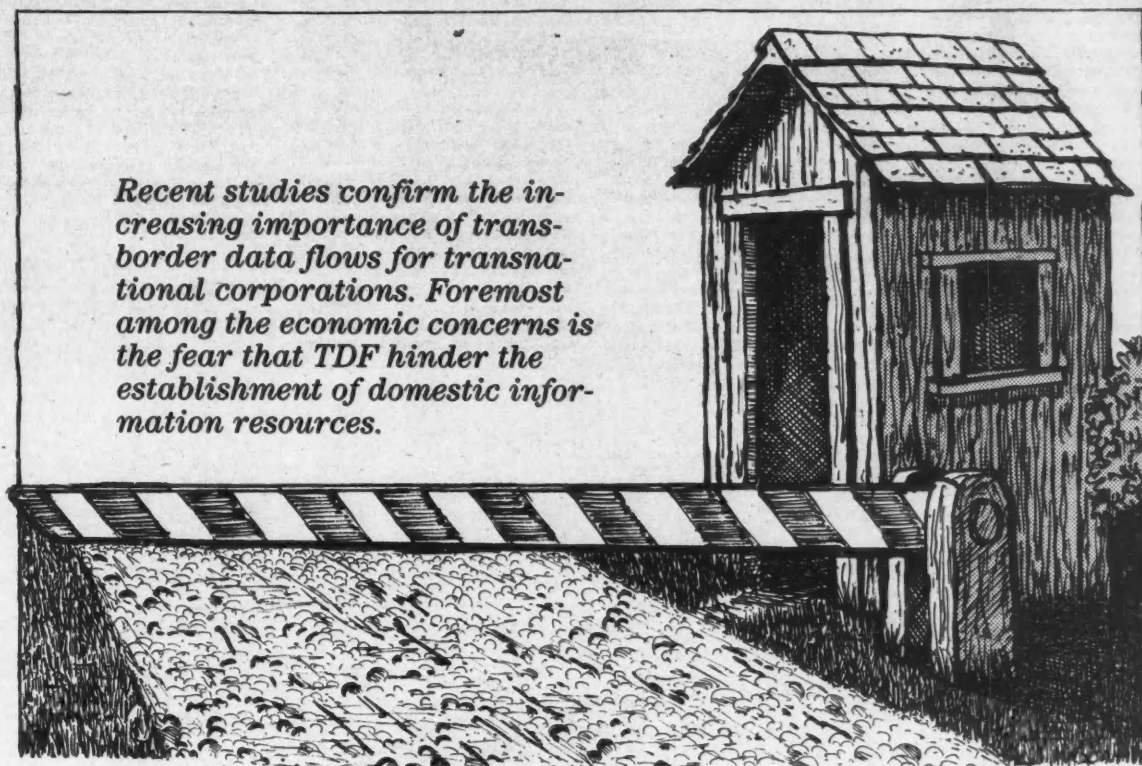


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IN DEPTH

Recent studies confirm the increasing importance of transborder data flows for transnational corporations. Foremost among the economic concerns is the fear that TDF hinder the establishment of domestic information resources.



The growing dependence on transborder data flows

By Karl P. Sauvant

Corporate transborder data flows (TDF) account for the bulk of international data traffic. A recent study prepared by the National Telecommunications and Information Administration for the U.S. Senate observed: "International data communications have become crucial to the operation of U.S. multinational companies." This observation is echoed in a recent report by Business International, which concluded that transnational corporations "are dependent on the computerized flows of information to conduct their business today — and will be more so tomorrow."

Few publicly available studies, however, survey the use of TDF by these corporations. The principal ones have been undertaken by the Organisation for Economic Co-operation and Development (OECD), the Intergovernmental Bureau for Informatics (IBI) and Business International (BI). The primary objective of all three studies was to ascertain the uses and corporate effects of transborder data flow. They differed, however, in their samples and methods of implementation and are not necessarily representative. Nonetheless, they are indicative of corpo-

rate experience with transborder data flows in a large number of firms, and they are consistent in terms of their findings regarding the importance of TDF, the principal uses of these flows and the benefits that they provide for the firms that utilize them.

Eighty-eight percent of the companies participating in the BI survey stated that TDF were important or very important for at least one corporate function, a percentage that increased to more than 90 when managers were asked to predict importance for 1988. The principal obstacle to the growing use of TDF appeared to arise from inadequacies of the telecommunications network, particularly in developing countries. The IBI survey found, for instance, that 36% of the responding corporations planned to establish computer communications systems as soon as local conditions permitted; 29% indicated that such systems had already been established.

Laws and regulations, on the other hand, appeared to have little influence on the growth of TDF at the present time; 44 of 62 companies that evaluated this matter in the BI study did not believe that such actions affected locational decisions. This finding is corroborated by the OECD study — according to which, on a scale of 0 (no obstacles) to 2 (severe obstacles), laws and regulations scored 0.6 on the average — and by

IN DEPTH/TRANSBORDER DATA FLOWS

the expansion of transnational computer communications systems in Brazil.

The three surveys also agreed on the relative importance TDF have for various functional areas of corporate activities, allowing, of course, for variations by sectors. Financial management was by far the corporate function in which TDF were mostly used (see table on ID/21). In the OECD study, financial management accounted for 43% of total TDF use, reaching, however, 64% in services. In the case of the BI study, 60% of all transnational corporations surveyed rated these flows as important or very important in 1983, and 73% gave them those ratings for 1988.

That evaluation did not differ substantially between U.S. and Western European firms, although the lat-

TDF are a major element in the process by which transnational corporations take advantage of new technological possibilities and adjust to the changing economic environment.

ter reached a rating of more than 80% for the future importance of TDF in this area. Financial management was followed relatively closely by marketing and distribution (including ordering, inventory control and invoicing) as far as its perceived importance to users was concerned, although the volume of flows involved was smaller.

TDF were also considered quite important for production (especially in extractive industries), management (including strategic planning

and research and development (especially in some manufacturing and extractive industries), but less so for personnel and payroll management. Noteworthy are the relatively high ratings for manufacturing, strategic planning and computer-aided design, manufacturing and engineering (CAD/CAM/CAE). The last function, in fact, had the highest growth rate in the BI study: Almost twice as many companies as in 1983 expected TDF to be important in this corporate activity within five years. How-

ever, TDF were also expected to grow in importance in virtually all other activities in most industries.

The benefits these corporations derive from the use of TDF lie, first of all, in the area of increased corporate efficiency. In the BI study, 40 of 65 firms that addressed this issue stated that corporate efficiency had increased as a result of the use of TDF; 25 did not address the effect on efficiency directly, but felt that their companies had to use TDF since these flows had become a necessary tool to do business internationally; only one firm indicated no increase in efficiency.

For one-third of the responding firms, TDF opened new business opportunities — for example, in the area of foreign exchange management and the creation and sale of data bases — and 18 used these flows to introduce new technologies in production.

Technological edge

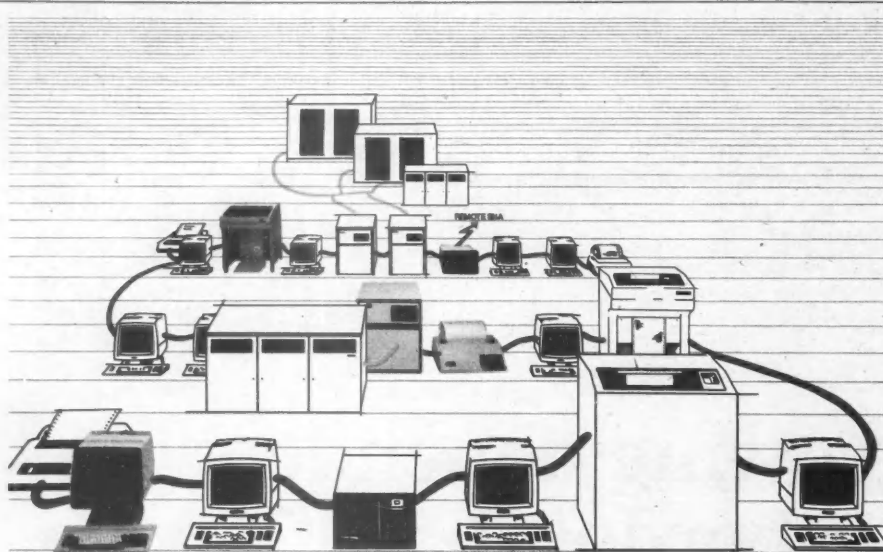
Put into a broader context, TDF are a major element in the process by which transnational corporations take advantage of new technological possibilities and adjust to the changing economic environment. More specifically, the OECD study suggests that the use of TDF has had three major efficiency implications: First, it has encouraged greater integration within corporations, increasing the specialization gains ensuing from closer international interdependence. Second, it has expanded the international supply of new services, such as access to computerized data bases and on-line software maintenance, accelerating the diffusion of technological advances. Third, it has improved financial management in transnational corporations.

The picture that emerges from all three studies is that these corporations rely considerably — and increasingly — on transnational computer communications systems. They do this not only to send messages faster (for example, for ordering, marketing, distribution, invoicing, sourcing), but also to improve management information (which cuts, of course, across all areas, but is of particular importance in such corporate functions as financial control, strategic planning, inventory control).

Another result is to change the manner in which corporations actually engage in production activities (for example, in manufacturing, research and development and CAD/CAM/CAE).

The impact of TDF

The impact of TDF on countries is likely to be profound and multifaceted. However, this impact has neither manifested itself clearly nor been the subject of much empirical research. All that can be done at this stage is, therefore, to identify some issues and



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discuss possible implications for research. In doing this, attention focuses mostly on possible problems associated with TDF, because they could prevent the full realization of the benefits.

These benefits are wide-ranging. For corporations — be they from developed or from developing countries — TDF permit more efficient management in an uncertain and unpredictable environment. But the benefits extend beyond the corporate sphere. The developments in informatics and telecommunications have substantially increased the ability to handle large amounts of data and, therefore, have improved the possibilities for better-informed decision making concerning virtually all matters. Particularly important in this context is access to a rapidly expanding pool of up-to-date knowledge stored in automated data bases. For instance, growing data networks may allow better management of natural resources (through the use of on-line commodity-quotation data bases) and facilitate access to information of importance for export and import purposes, technology transfer and the like. Better knowledge in those areas may strengthen the bargaining capacity of developing countries.

The use of TDF also may facilitate the transfer of information resources — especially data bases and software, but also hardware and information skills — to developing countries, may permit the establishment of new industries, such as data base services, and may help prevent a

| Corporate activity | 1983 | | | | 1988 | | | |
|--|---------------|----------------|-------|-------|---------------|----------------|-------|-------|
| | United States | Western Europe | Other | Total | United States | Western Europe | Other | Total |
| Financial functions | | | | | | | | |
| Financial management | 63.5 | 57.7 | 45.4 | 59.6 | 71.2 | 80.7 | 63.6 | 73.0 |
| Investing | 30.8 | 34.6 | 27.3 | 31.5 | 34.6 | 46.2 | 36.4 | 38.2 |
| Financing | 28.6 | 30.8 | 18.2 | 28.1 | 30.9 | 38.5 | 27.3 | 32.6 |
| Portfolio management ^a | 15.4 | 23.1 | — | 15.7 | 23.1 | 26.9 | — | 21.4 |
| Foreign exchange management ^a | 13.5 | 7.7 | 5.1 | 11.2 | 17.3 | 15.4 | 9.1 | 15.7 |
| Marketing and distribution | | | | | | | | |
| Ordering | 36.5 | 30.8 | 45.4 | 36.0 | 42.3 | 34.6 | 45.4 | 40.4 |
| Marketing and distribution | 34.6 | 30.8 | 45.4 | 34.6 | 40.4 | 53.8 | 54.6 | 46.1 |
| After-sales service | 21.2 | 19.2 | 38.4 | 22.5 | 26.9 | 19.2 | 36.4 | 25.9 |
| Customer service | 11.5 | 23.1 | 18.2 | 15.7 | 11.5 | 23.1 | 18.2 | 15.7 |
| Pricing information | 3.8 | 3.8 | — | 3.4 | 3.8 | 11.5 | — | 5.6 |
| Production | | | | | | | | |
| Inventory control | 38.5 | 26.9 | 27.3 | 33.7 | 44.2 | 46.2 | 36.4 | 43.8 |
| Manufacturing | 34.6 | 23.1 | 18.2 | 29.2 | 44.2 | 34.6 | 18.2 | 36.2 |
| Sourcing | 19.2 | 7.7 | 27.3 | 16.8 | 34.6 | 11.5 | 27.3 | 27.0 |
| CAD/CAM/CAE | 17.3 | 7.7 | — | 12.4 | 30.8 | 11.5 | 9.1 | 22.5 |
| Product quality testing | 13.5 | 7.7 | — | 10.1 | 15.4 | 11.5 | 18.2 | 14.6 |
| Management | | | | | | | | |
| Strategic planning | 20.8 | 15.4 | 18.2 | 24.7 | 44.2 | 26.9 | 27.3 | 37.1 |
| Management information | 15.4 | 26.9 | 18.2 | 19.1 | 25.0 | 30.8 | 18.2 | 25.8 |
| Electronic mail | 9.6 | — | 9.1 | 6.7 | 13.5 | — | 18.2 | 10.1 |
| Research and development | | | | | | | | |
| Research and development | 23.1 | 26.9 | 9.1 | 22.5 | 32.7 | 36.5 | 18.2 | 32.6 |
| Design engineering | 21.2 | 7.7 | — | 14.6 | 25.0 | 11.5 | — | 15.0 |
| Personnel | | | | | | | | |
| Recruit, personnel | 23.1 | 11.5 | 9.1 | 18.0 | 26.8 | 15.4 | 9.1 | 22.5 |
| Total number of firms | 52 | 26 | 11 | 89 | 52 | 26 | 11 | 89 |

a. Percentage of companies that consider TDF to be important or very important for specified corporate activities.

b. Several companies appear to have subsumed foreign exchange management under portfolio management.

c. Applies to banking/finance, transportation and information service companies.

Source: Business International

Importance of TDF by corporate activity and region, 1983 and 1988 (percent)

widening of the gap between the "information rich" and the "information poor."

A final point that deserves mention is the impact of TDF on the

competitive position of enterprises in developing countries. These enterprises may also wish to consider how they can utilize these flows profitably to increase their competitive-

ness in the world market. This applies also to the phenomenon of closed user-group networks such as Swift and Sita. It may well be, for instance, that it is almost a precondition for banks from developing countries wishing to play a role in international financial markets to be linked to the closed user-group network of their own industry (or, alternatively, to have their own corporate networks).

To the extent that such networks are emerging in other industries as well and that firms from developing countries are not linked to them, their competitive position may suffer. Conversely, to the extent that domestic enterprises use TDF, they may be able to improve their competitiveness with respect to transnational corporations and in world markets.

The potential problems raised by TDF also relate to a wide spectrum of issues. Some of them cut across all groups of countries, some are mostly the concerns of importers of data and data services, while others primarily pertain to exporters.

Privacy concerns were among the first to be linked to TDF; in fact, they served to focus attention on that phenomenon. In response to the increased use of automated data bases containing information about individuals, national laws and regulations were adopted to ensure the individual's right to privacy.

The advent of TDF led to the fear that those flows could be used to circumvent national regulatory actions. International approaches

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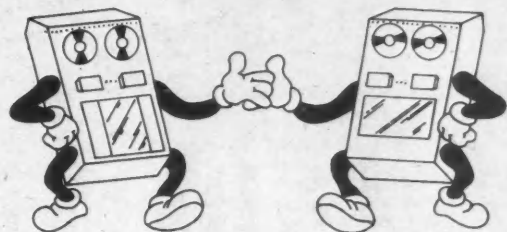
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were sought to forestall such possibilities and reconcile legitimate national concerns about privacy with a shared commitment to the free flow of information. The results were the Guidelines Governing the Protection of Privacy and Transborder Flows of Personal Data, adopted by the Council of OECD on Sept. 23, 1980 and the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data, adopted by the Committee of Ministers of the Council of Europe on Sept. 18, 1980.

In the preparatory work for these instruments, most of the principal problems related to TDF and privacy issues were identified, and agreement was reached on them in the ensuing negotiations.

With the adoption of this regulatory framework, attention has shifted to other issues:

If internationally available information resources are more competitive, local users will prefer international to nascent domestic resources, making it difficult for domestic infant industries to grow and to develop forward and backward linkages.

■ Technical matters, such as standards and protocols, which are mostly dealt with by the International Telecommunication Union.

■ Legal issues, such as intellectual property rights and liability questions and the right to have access to local public telecommunications networks. Some of these issues are dealt with by the United Nations Commission on International Trade Law and OECD.

■ Sovereignty issues (the concept of informational sovereignty, especially in relation to remote-sensing data, has been formulated in this regard).

■ Cultural identity.

■ Vulnerability.

■ Barriers to the flow of data and data services, including those arising from telecommunications regulations.

Finally, and perhaps most impor-

tant, TDF have given rise to a range of economic issues, especially in relation to their developmental impact. Underlying the economic concerns are two factors: the structure of the international data market and the importance of information resources.

Most information resources are located in the developed market economies. The overwhelming share of the research and development related to information resources, of the infrastructure for TDF (the manufacturing of information hardware and software and the coverage of data networks) and of the commercial application of TDF is located in those countries.

The developing countries are mostly suppliers of raw data and consumers of processed data, that is, information. This uneven distribution of information resources and the TDF associated with them must be viewed against the growing importance of microelectronics and the role of the information sector in all economic activities. Inadequate na-

Transnational corporations play a key role in the international allocation of information resources.

tional information resources and limited participation in TDF are, therefore, regarded as being of strategic economic importance, especially for the future development and competitiveness of the national economy.

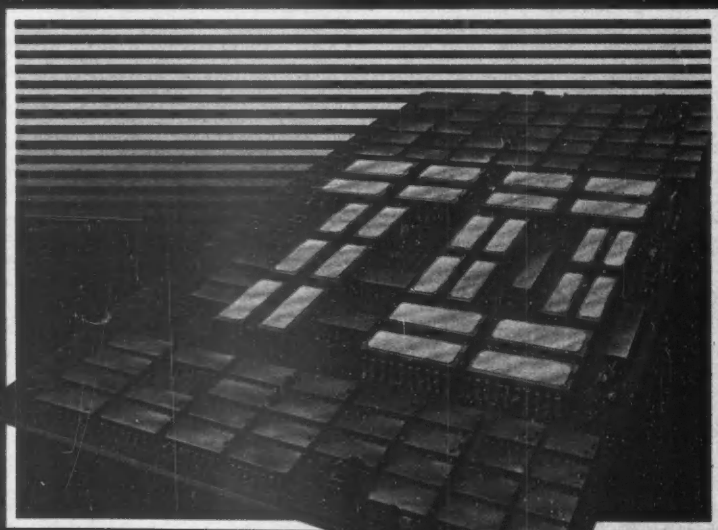
As the policies of such countries as France and Brazil indicate, those considerations apply to developed and developing countries alike and can even become part of considerations of national security.

Foremost among the economic issues is the fear that TDF hinder the establishment of domestic information resources. To the extent that some information resources are available elsewhere (including in headquarters of regional centers) and can be accessed easily, market pressure to establish domestic information resources may be reduced. If internationally available information resources are more competitive, local users will prefer international to nascent domestic resources, making it difficult for domestic infant industries to grow and to develop forward and backward linkages.

This situation, in turn, may have implications for a country's employment picture and balance of payments.

Another set of economic concerns relates to the role TDF play in areas other than information resources. Since those flows are being used in a broad range of economic activities, the lack of domestic information resources may increase the dependence (and vulnerability) of domestic industries in general. This may be particularly accentuated in the area of technology. While TDF certainly permit better access to information resources available worldwide, they may, at the same time, decrease the incentive to develop indigenous technological capacities.

The role of transnational corporations in these processes deserves particular attention because they are the principal actors in international economic relations, are almost entirely headquartered in developed market economies and account for



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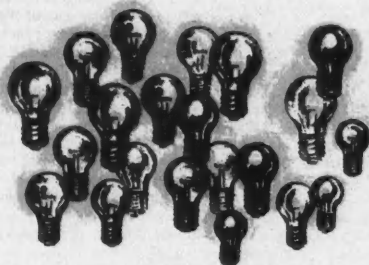
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IN DEPTH/TRANSBORDER DATA FLOWS

the overwhelming share of commercial and corporate TDF. Hence, they play a key role in the international allocation of information resources.

The present structure of the international data market, combined with the importance of TDF, leads to the concern that the developing countries may remain blocked in the evolution of the international division of labor at those future activities that are comparatively less sophisticated and have fewer spin-off effects (such as research and development).

The role of transnational corporations is also important because the intrafirm international division of labor of these organizations is a microcosmos of the international division of labor. It may be that within transnational computer-communications systems, less sophisticated information activities are located in

The increased use of TDF, especially for corporate production functions, may affect the international division of labor, even if data flows permit better access to sophisticated information resources located in developed countries.

one set of countries (for example, the mere inputting of data), while the more sophisticated ones are undertaken in another set of countries. That this fear is not entirely groundless is suggested by data pertaining to Canada and data generated by the BI study. It has been estimated that a vast majority of Canada's TDF involves data flows from foreign affiliates in Canada to parent corporations abroad, mostly in the U.S.

The BI study found that foreign

affiliates in developing countries typically send their data to headquarters or regional centers located in developed market economies, which may suggest that the imbalance here is even stronger than in the case of Canada.

The increased use of TDF, especially for corporate production functions, may therefore have an effect on the international division of labor, even if data flows permit better access to sophisticated information re-

sources located in developed countries.

The intention is not to fault transnational corporations for taking advantage of the possibilities offered by the new information technologies. It is rational corporate behavior to improve efficiency, which, as demonstrated earlier, TDF are generally credited with doing. Often, in fact, transnational corporations have little choice in their location of information resources, since local skills and the telematics infrastructure are too weak to permit the competitive location of certain activities in developing countries. However, a vicious cycle that reproduces itself as an outcome of basic market processes can only be avoided by strengthening local information resources, in many cases on a selective basis.

This objective will normally require the adoption of appropriate government policies at the national and international levels, some of which may affect transnational corporations. Without these policies, many countries, especially developing ones, may not be in a position to benefit fully from TDF (particularly if they do not have an adequate infrastructure), and they may be more prone than not to regard TDF with suspicion and as a threat to their economic development.

Over the longer term, TDF — if seen as part of broader developments in microelectronics, informatics and telecommunications — may contribute to far-reaching changes in the locational determinants of foreign direct investment. The crucial factor here is automation. While automation is a development much broader than TDF, its internationalization as an ongoing interactive process is effected through TDF. The accelerating automation of production may erode one of the principal comparative advantages of most developing countries, the abundant supply of inexpensive labor.

Indeed, the question would have to be raised whether it would still remain attractive for certain foreign direct-investment projects to be located in developing countries. Even to the extent to which transnational corporations invest in developing countries, however, certain corporate activities may increasingly be undertaken remotely via TDF and hence not be transferred to the host country. TDF thus may affect the ability of developing countries, especially those that lack an adequate telematic infrastructure, to industrialize successfully and remain competitive in world markets, altering patterns of international investment and international trade in goods and services.

These broader interactions between TDF and the overall restructuring of the world economy must be taken into account in the formulation of policy responses that aim at dealing with the concerns associated with TDF while improving the opportunities to harness the positive effects of these flows for the development effort.

About the author

Karl P. Sauvant is the project officer within the Centre on Transnational Corporations for the center's project on transborder data flows. The Commission and the Centre on Transnational Corporations are the focal points within the United Nations system for all matters relating to transnational corporations.

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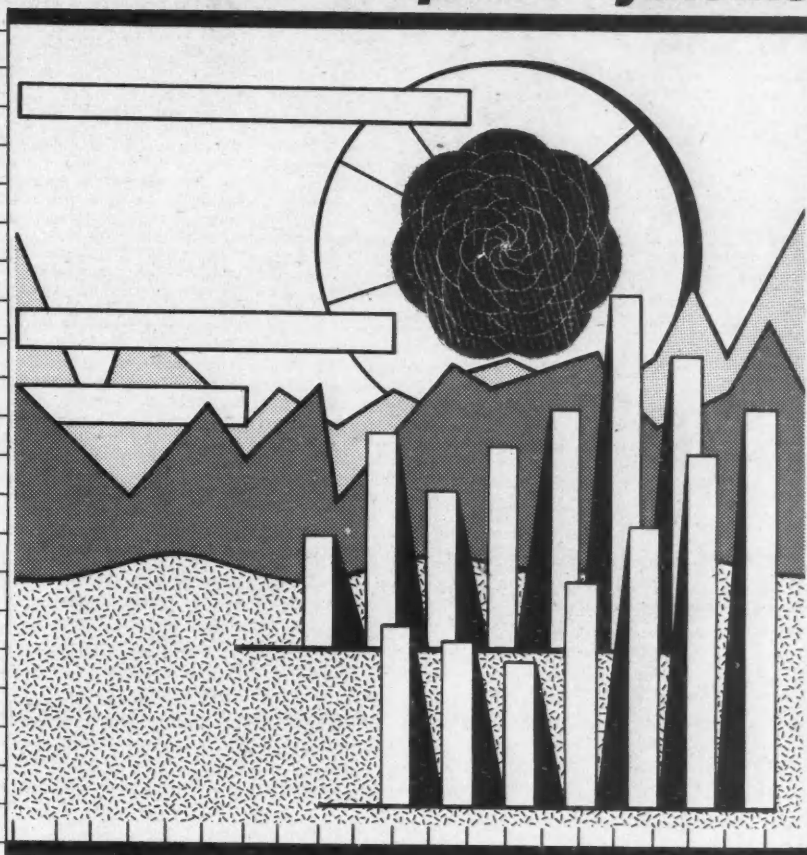
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SPECIAL REPORT

Graphics Systems



More than pretty pictures

June 25, 1984

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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NAPLPS demands conservation tactics

By Richard H. Veith
Special to CWI

At the center of a crowded, windowless work area at National Broadcasting Co. headquarters in New York are three special graphics terminals. Throughout the day, artists and writers take turns using the terminals to create the pages of illustrated news and feature stories that are broadcast as NBC Teletext, NBC's year-old teletext service. In addition to their creative concerns, these artists and writers must worry about bytes.

Teletext is a technique for inserting digital pulses into a television signal without affecting the television picture information. At the receiving end, decoder modules in or attached to television sets can be used to transform the digital stream into selectable pages displayed on the television screen.

The need to make the most of each byte in the graphics and text displays stems from a number of factors, including the size of the transmission path, hardware considerations at the transmission end, hardware limits at the receiving end, software parameters in the page management system and characteristics of the graphics standard used — the North American Presentation Level Protocol Syntax (NAPLPS). The NAPLPS specification is an Ansi standard established for videotex and teletext applications.

In practice, most of the factors affecting the total number of permissible bytes per page are more or less fixed. In standard broadcast teletext, a maximum of 1,680 data bytes can be transmitted per second using one scan line in the television picture signal.

The NBC network is currently using two scan lines, yielding an effective

data rate of about 26.8K bit/sec. Put another way, for teletext pages of 1,500 bytes, two pages are broadcast per second, which is a reasonable rate for cyclic teletext, given the current capabilities of the decoders at the television sets.

The production staff, using AT&T graphics terminals (AT&T's Frame

Creation System for NAPLPS graphics), can actually create pages that well exceed the 1,800-byte limit. Thus, on occasion, much time is spent modifying and recreating a graphics display in order to reduce the byte count of the page while maintaining the desired level of artistic sophistication. This is especially true when a completed design exceeds the limit by only a few bytes.

More and more people are attempting to come to terms with the production of fine graphics in a byte-conscious environment.

Most teletext and videotex systems face the same or similar constraints on page size, and therefore more and more people are attempting to come to terms with the production of fine graphics in a byte-conscious environment.

Within NAPLPS, as implemented on the AT&T frame-creation terminals, there are several ways to minimize the number of bytes used, but the most desirable procedures are those that do not sacrifice artistic quality. Obviously, bytes can be reduced by removing graphics objects in whole or in part, although this could result in a less defined and less exciting display. But other procedures are possible.

If an object is to appear on a page a number of times, bytes are not necessarily saved by using the COPY com-

mand instead of redrawing the object. While the use of the COPY command saves production time, it usually has no effect on the number of bytes used. For irregular objects, however, the byte count could be affected because each additional drawing might not have exactly the same characteristics as the previous version had.

Using a LINK command is equivalent to establishing a macro, so copies of graphics objects need not exist individually, but rather as separate calls to one macro. There is an overhead, however, of about 20 bytes to establish the macro. Therefore, for low-byte objects, it is not helpful to use the LINK or macro feature. If an object has more than eight bytes, it can become advantageous to use LINK for additional copies, depending on how many copies and how large (that is, greater than eight bytes) the original object is.

In NAPLPS, Ascii text is always defined within a text block, an imaginary rectangle outlining the set of characters in any given block. A text block can be as small as one character or as large as the screen. The first thing to know about text blocks is that the defined area is always a rectangle, and blanks count as bytes. It is usually not helpful, then, to mix long lines of text with short lines. Two or more text blocks can be used, with no effect at all on the resulting display except for a smaller byte count.

Another consideration with text is that there is a 14-byte overhead to establish a text block, and bytes are added for line feeds. Characters

See NBC SR/8

Veith is operations manager for NBC Teletext in New York.

Modular graphics can fill in until standards arrive

By Phil Neray and Shahpoor Shayan
Special to CWI

Much has been written about the emergence of graphics standards, and it is not surprising that many users are confused by the bewildering array of acronyms — Core, GKS, NAPLPS, VDI and others.

Unfortunately, the standardization process is a slow one, with the average time for a standard to become official now approaching several years. Many standards are still in the proposal stage, and in the meantime, users must choose among systems that may or may not conform to future standards.

But users need not quit in despair. Instead, they should look for graphics software systems that implement existing standards whenever possible and are based on modular graphics architectures that will allow the incorporation of future standards as they are approved.

A modular graphics architecture should ensure that the system is extensible. Extensibility means that the system can easily incorporate future standards without affecting application software that has already been

written. It also means that the system can support different output devices like high-resolution video screens, pen plotters and dot matrix printers.

Finally, an extensible microcomputer system can also be easily programmed to emulate existing graphics terminals or newer terminals like the North American Presentation Level Protocol Syntax (NAPLPS) terminals used for videotex applications.

A modular graphics architecture must define two interfaces — the programmer interface and the virtual device interface (VDI). The third interface, known as the physical device interface, is unique to specific devices such as pen plotters or video bit-map displays.

Graphics application programs are written with high-level calls to a graphics library, known as the utility layer. The programmer interface is a set of rules that define the functions in this library and rules for communicating with it.

Library routines are used for commonly used graphics functions — drawing circles, adding color or scal-

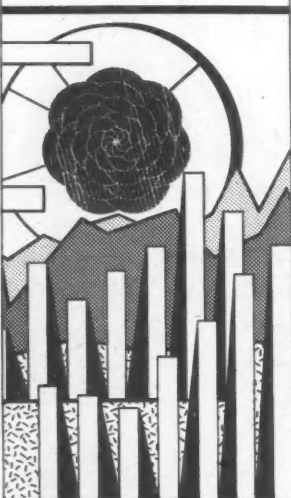
ing a picture to fit into a given area. These routines do all the work associated with generating a graphics image, letting the application programmer concentrate on the application itself.

The two most commonly used programmer interfaces are the Core system and the Graphics Kernel System (GKS). While the Core system has been in use for a longer period and has been implemented on most mainframes and minicomputer systems, the GKS system is expected to become an official Ansi standard late this summer.

The primary benefit of standard interfaces like GKS and Core is the portability of applications. Software developers, whether in-house or third-party, want to run their software on various operating systems with a minimum of conversion effort. High-level interfaces like Core and

See STANDARD SR/8

Neray is graphics product manager and Shayan is engineering manager for Digital Equipment Corp.'s Professional 300 series.



The colored rose on the cover of this Special Report is the creation of Nancy Blumenstark Mingus, a DP training consultant based in Williamsport, N.Y. Mingus generated the rose on an IBM 3033 running MVS/TSO from an APL program using calls to Graphpak. The design was drawn on an IBM 3279 color graphics terminal and printed on an IBM 3287 color printer.

SPECIAL REPORT

Thematic mapping prepares to break out of its niche

Microcomputers, business graphics let users take advantage of cartographers' tool

By Donald F. Cooke
Special to CWT

Geographers and data analysts have been producing thematic maps by computer for more than 20 years. The current boom in business graphics and microcomputers is dramatically lowering the barriers to widespread computer mapping of data.

However, as this field grows, more and more difficult problems must be overcome to make further progress. Nevertheless, present obstacles will be overcome, resulting in millions of people routinely using mapping by the end of the decade.

Thematic mapping is the graphics display of any kind of information, or theme, for the purposes of locating events or objects, detecting geographic patterns or displaying flows from one area to another. For example, consider a map with an "X" at the location of each 24-hour automated teller machine; such a map incorporates point data. Another map, with counties colored according to population density, uses area data. A third map, a map of the world with arrows of varying widths showing patterns of crude oil shipping, uses line data. The category names are a normal part of the cartographer's vocabulary.

How do we use such data to make maps with a computer? There are five elements to thematic mapping by computer:

- The data to be mapped.
- A computer.
- An output device.

Cooke is president of Geographic Data Technology, Inc. in Lyme, N.H., a company specializing in digital map production.

■ Mapping software.

■ A cartographic data base. The cartographic data base is simply a special data file that relates each data observation to its spatial location in terms of either latitude and longitude or some other coordinate scheme.

A surprising amount of data can be mapped because of some locational aspect of the information. For example, an employment record contains a home address of an employee, and a traffic accident record includes the location of an accident. The Census Bureau publishes billions of bytes of data tied to geographic locations as small as a city block. Even the Yellow Pages records the address of each listed establishment. But none of this data can be mapped directly by any existing mapping system; the location identifier (the address or block number) must be related to spatial coordinates first.

Any microcomputer set up for business graphics can do computer mapping. In fact, the current emphasis on graphics, evident in the design of computers like the Apple Computer, Inc. Macintosh, makes some microcomputers ideal for mapping.

No longer do we have to plot maps on line printers. We now have a wide variety of better and cheaper options. While pen plotters cost tens of thousands of dollars in the 1960s, they are common for one or two thousand dollars now.

Besides pen plotters, mappers now use film recorders, ink jet plotters and electrostatic laser and dot matrix printers to display publication maps. Another option that was not available in the 1960s is the ability to interact with a color map displayed on a CRT terminal. The ability to pre-

view a map before printing it saves time and often replaces the need for hard-copy output.

Until only a few years ago, most mapping software was developed and distributed by universities. The most notable examples included Harvard University's Symap, Caliform, Aspx and Odyssey systems. These systems often included facilities to let the user create and manipulate the coordinates needed for mapping; Symap, for instance, included a specially calibrated ruler for measuring mapping coordinates.

An obstacle overcome

For years the largest obstacle to the growth of computer mapping was the need to get out the Symap ruler every time you wanted to map a new area. The solution to this problem came first from the government and later from the private sector, in the form of general cartographic data bases containing the coordinate information necessary for mapping whole classes of data.

A cartographic data base provides the linkage between the data to be mapped and the spatial coordinates needed by the mapping program to display the data in the right place on the map. The cartographic data bases must be in a form appropriate for mapping the data.

For example, to map county data, the cartographic data bases should consist of a string of coordinate measurements around the boundary of each county. To map the Yellow Pages, the cartographic data bases must consist of short street segments with low and high addresses delineated by endpoint coordinates, from which individual address locations can be interpolated. Ultimately, the

most useful cartographic data bases may be a file relating each ZIP+4 code to an individual latitude and longitude.

Looking at the rest of this decade, the biggest growth area in computerized mapping will be in the field of in-vehicle navigation systems. The logic of this makes sense: The largest application of conventional maps is normal vehicle navigation.

This year we are seeing the technology of automated vehicle navigation move from the concept-car stage to the appliance stage. A vehicle-location appliance was exhibited at the most recent convention of the American Congress on Surveying and Mapping.

Vehicle navigation systems use satellite, loran, inertial or dead-reckoning sensors coupled to an on-board computer to keep track of a vehicle's location. On a display screen, they show the vehicle's position relative to either a digital map plot or a transparent overlay. In both cases it is possible to show thematic information like landmarks, tourist attractions, motels or restaurants as needed by the driver.

While such systems may seem like a frivolous application of technology, it is sobering to calculate the cost of the 4% proportion of driving that is wasted because of inefficient route finding or because a driver is totally lost.

As these systems become commonplace — as they will be by the end of the decade — we will see digital thematic mapping mature from a tool used only by market researchers and site analysis specialists to a widely used appliance function with benefits ranging from making better decisions to saving time and energy.

Mapping's past and present portend a healthy future . . .

The first cartographic data base of national importance defined all U.S. counties; it was made by the U.S. Department of Transportation in the late 1960s and later improved by the Commerce Department's Bureau of the Census. Although recently replaced by a more accurate file from the Census Bureau, it is still the most widely used cartographic data base.

Around 1970 the Census Bureau created Dual Independent Map Encoding (DIME) files for the urban portions of most large cities. The DIME files permit detailed coding of addresses to coordinates and defined boundaries of zones as small as city blocks.

In 1974, the Census Bureau released another cartographic data base, this time defining census tracts (small statistical tabulation zones) for many U.S. metropolitan areas. These formed the basis of a computer-produced publication series called the *Urban Atlases*; the cartographic data bases have become known as the Urban Atlas files. Availability of both county

and tract boundaries induced several companies to add mapping either as an extension to their product lines or as a feature of a general graphics system.

By the early 1980s, companies devoted solely to computerized thematic mapping were formed. During the period from 1980 to the present, cartographic data base production also went private, with boundary files for 1980 census tracts, counties, towns, cities, areas of dominant influence and five-digit ZIP codes commercially available.

Currently there are about 15 companies that make computer maps on a service-bureau basis, eight time-sharing services offering mapping and over a dozen vendors of mapping software. In the past year, the number of firms advertising microcomputer mapping programs in *American Demographics* magazine has gone from zero to six. The installed base of computers capable of supporting computer mapping — essentially those that can support business graphics — is growing rapidly.

. . . But some obstacles loom along its path to acceptance

Although thematic mapping is growing as an application, there are still barriers to its wide acceptance.

A primary barrier is limitations of currently available software. Most mapping software produces either a flat-tone, shaded map or a perspective view of a surface generated using data values as altitudes. Only two known programs display proportional symbols, such as a pie chart, to represent data. None of the existing software can display large amounts of incidence data — data located at a point — or any amount of information about traffic or commodity flows. The ability of current software to plot cosmetic orienting information like street names or place labels is limited.

A second barrier is price. Main-frame mapping costs between \$4,000 and \$20,000; until very recently micro-based software cost about \$1,000. Given the example of current integrated microcomputer software, a single function like data base management or mapping should cost between \$150 and \$200.

A third barrier concerns prepar-

ing data for incidence mapping. A dream of mappers is to be able to access a large data base like the Dun & Bradstreet Corp. business file, select a business category and map each selected business with an individual symbol.

However, before this is possible, someone must supplement each business record with an individual coordinate measurement by matching each business address to a cartographic data base like the Census Bureau's Dual Independent Map Encoding (DIME) file. This is a huge task, since present address-matching techniques only match 80% to 90% of input addresses. The remainder must be processed clerically.

Because of the size of a nationwide DIME file (about one billion bytes), large-scale address matching is limited to mainframe operations. However, it is likely that improvements in storage technology such as audio disk technology will put nationwide address matching on-line in the microcomputer environment within a few years.

DIGITAL DISPLAYS THE TERMINALS BEST ENGINEERED FOR BUSINESS.

Before you make any investment in business graphics terminals, it really pays to investigate what you'll be using them for.

If you're like most businesses, your terminals will be used approximately 70% of the time for generating text and numbers. And only around 30% of the time for strictly graphics purposes. The October 1983 *Infosystems* article, "How to Buy Graphics Displays," coauthored by Jim Warner, CEO of Precision Visuals, Inc., states, "While it may be true that one picture (chart, graph) is worth a thousand words, there will always be the need for words, thousands of words, in the day-to-day activity of the office. Special graphics-only devices can have limited value in a general office environment."

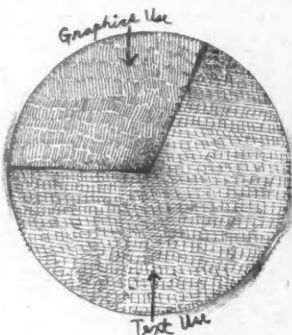
At Digital, the first step in engineering every product we make involves a thorough analysis of who will use it, what it will be used for and which features will help make people more productive in their jobs.

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And you'll find it's equally true of Digital's latest entries, the VT240™ and VT241™ terminals.

ENGINEERED BEST FOR WHAT YOU NEED MOST.

As the newest members of Digital's family of terminals, the VT240, a conversational



text and graphics terminal, and the VT241, with the added

dimension of color, continue the tradition of engineering excellence for performance. They offer full VT100™ compatibility to take advantage of a host of offerings already developed. And to meet the needs of the business environment, you'll find a set of standard text features that are either unavailable on other terminals or may have to be purchased at an additional cost.

These features include bidirectional smooth scrolling, split screen, a choice of 80 or 132 columns per line and a double width/double height format. A highly legible 8 by 10 dot matrix character font displays true ascenders and descenders for exceptional crispness and legibility. If cer-

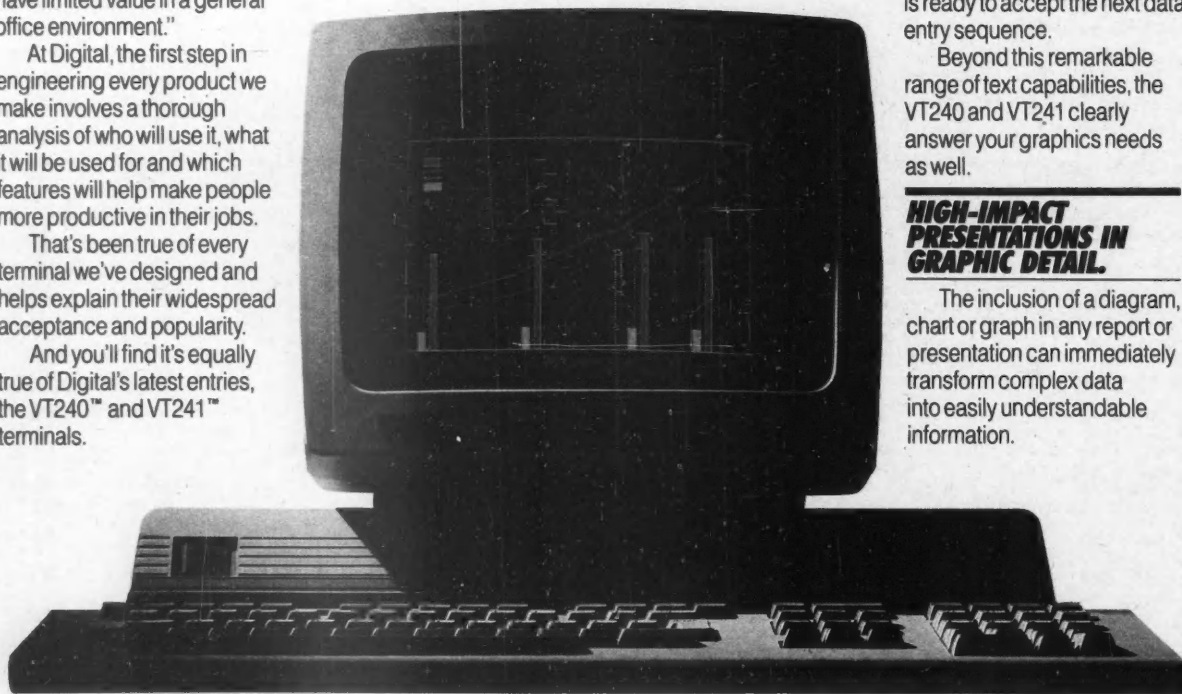
tain information needs to be highlighted, you can select from a combination of bold print, blinking and underlining in either normal or reverse video. For your added convenience, there's even a built-in printer port for printing hard copy.

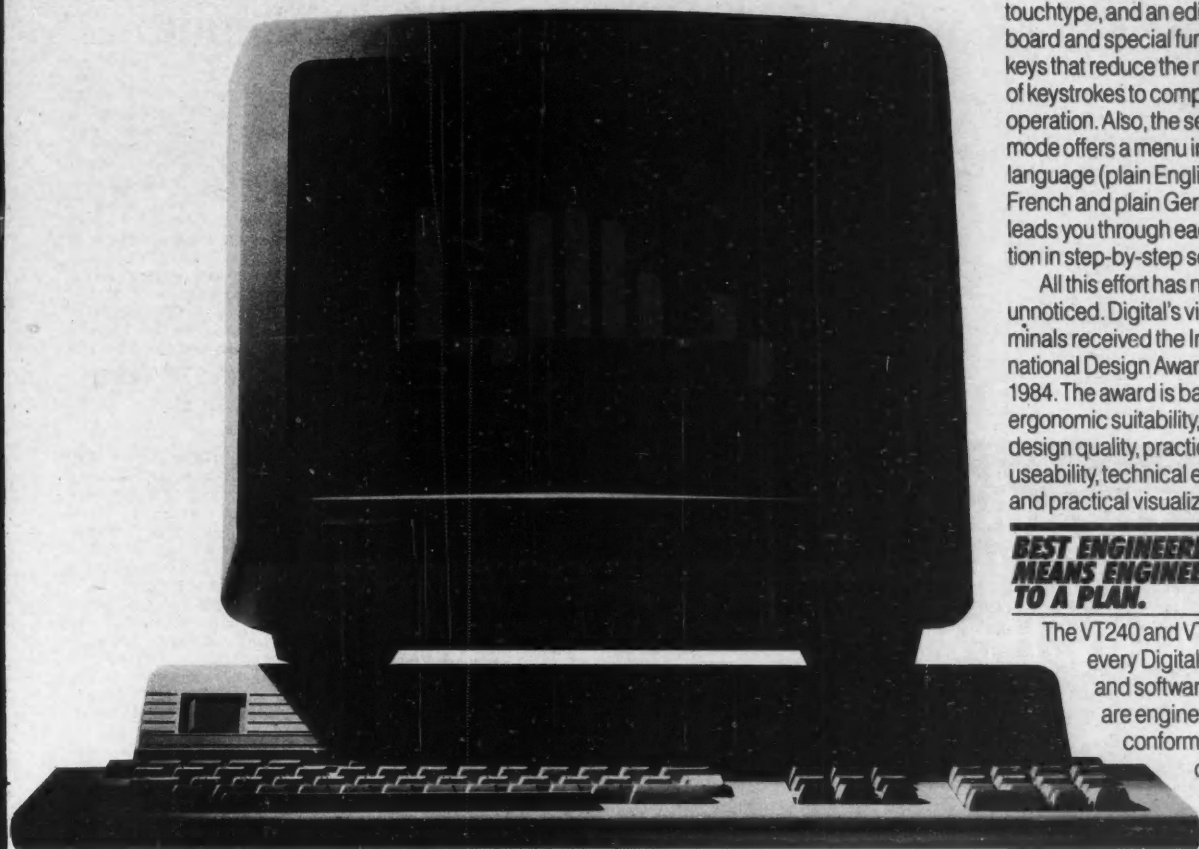
Both the VT240 and VT241 terminals give you the option of erasing selected character positions on the screen for more efficient communications and increased productivity. For those applications that require data to be entered by filling in the blanks of a form, once the data has been accepted by the host, the filled-in information—and only that—can be erased by means of a single command. The form itself remains up on the screen and is ready to accept the next data entry sequence.

Beyond this remarkable range of text capabilities, the VT240 and VT241 clearly answer your graphics needs as well.

HIGH-IMPACT PRESENTATIONS IN GRAPHIC DETAIL.

The inclusion of a diagram, chart or graph in any report or presentation can immediately transform complex data into easily understandable information.





touchtype, and an editing keyboard and special function keys that reduce the number of keystrokes to complete an operation. Also, the set-up mode offers a menu in plain language (plain English, plain French and plain German) that leads you through each operation in step-by-step sequence.

All this effort has not gone unnoticed. Digital's video terminals received the International Design Award in 1984. The award is based on ergonomic suitability, safety, design quality, practical useability, technical excellence and practical visualization.

BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

The VT240 and VT241, like every Digital hardware and software product, are engineered to conform to an overall

Both the VT240 and VT241 terminals generate bit map graphics in a choice of two protocols—Digital's ReGIS™ (Remote Graphics Instruction Set) and Tektronix 4010/4014™.



ReGIS lets you create and store business graphics as simply as producing ASCII text. With VAX-11 DECgraph™ and VAX-11 DECslide™ software, even a novice can prepare graphs and charts and turn them into slides. Self-explanatory icons let you

choose a box, circle, line, polygon, triangle or arc.

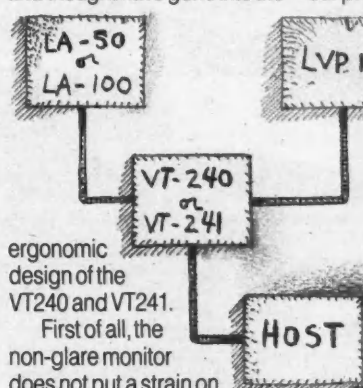
The Tektronix 4010/4014 protocol supports the full array of existing 4010 compatible graphics software. Besides, Tektronix Plot 10,™ TELL-A-GRAF™ and DISSPLA™ from ISSCO® and DI-3000,™ GRAFMAKER™ and GRAFMAS-TER™ from Precision Visuals are also supported.

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Analysts look at graphics trends, foresee shakeout

By Peter Bartolik
CW Staff

In a television advertisement for a mail service, a young executive resorts to projecting hand shadows on a screen when his presentation materials are not delivered. In the real business world today, the executive is just as likely to turn to some type of computer-generated graphics that is readily at hand.

With a vast assortment of companies marketing a staggering amount of graphics products — ranging from mainframe software to stand-alone systems to plug-in micro software packages — presentation business graphics is increasingly available

and ever more easy to use.

According to Deborah Kelly, a researcher with International Data Corp.'s (IDC) Pacific Technology Center, options available to users range from sophisticated software packages designed to manipulate the data bases of mainframes and minicomputers to low-cost microcomputer software packages.

Offerings for micros

At the microcomputer level, she said, the options range from basic software packages to more sophisticated systems specifically designed for business graphics.

Margo Downing-Faircloth, an ana-

lyst with Datapro Research Corp. of New Jersey, is currently conducting a survey of end users to determine what they want in the form of graphics. "Users are looking for things that will allow them to put data into graph form, such as pie charts and line graphs," she said, adding that users of microcomputers are choosing packages that cost from \$95 to \$1,500.

With the proliferation of microcomputers and the spread of computer literacy, some analysts see graphics becoming a commodity rather than a much-desired capability. Creative Strategies International, Inc., in a report published last year called

"Emerging Markets for Business Graphics," predicted that business graphics will cease to be a distinguishable market for hardware or software vendors, but rather will be a standard feature of office and business systems. "Business graphics will be one of many capabilities of such systems, not the principal justification for them," the report said.

That trend to incorporate graphics into standard packages is evident in the graphics capabilities of micro software such as Lotus Development Corp.'s 1-2-3 and even more evident recently in the introduction of bundled graphics on Apple Computer, Inc.'s Macintosh.

More options, less cost

According to IDC's Kelly, "The main thing that had been holding back business graphics was the problem of getting color output at a reasonable cost." Recent developments have provided users with a greater range of output device options and a decline in the costs of technology.

Pen plotters with color have decreased in price dramatically in the past two years, Kelly said. Additionally, more products are available that use ink-jet, thermal and even camera technology. Recently, Hewlett-Packard Co. introduced the \$3,945 LaserJet printer, which it claimed is comparable to the laser printers introduced for minis four years earlier at costs of more than \$100,000.

Vendors offering graphics products now number in the hundreds, and the proliferation has caused speculation that the market cannot support them all. Creative Strategies' report last year flatly predicted a shakeout this year of hardware, software and systems vendors, with leading industry manufacturers increasingly dominating the market.

"Financial Strategies in the Computer Graphics Industry," a just-released report from Lindgren Financial Services of Lamoni, Iowa, which examined the financial situations and strategies of 19 publicly held companies deeply involved in the graphics market, contended "that the pressure to grow in this industry will continue to force firms in the industry to put increasing amounts of money toward decreasing growth rates for the foreseeable future."

Squeeze in middle tier only

But that type of financial squeeze seems mainly to affect the middle tier of graphics products vendors, those mainly involved in developing graphics-specific, stand-alone systems.

Developers of software for large systems seem to be enjoying a boom. Integrated Software Systems Corp. of San Diego reported for fiscal year 1983 a 45% increase in revenues and a 72% increase in profits over the previous year.

According to Datapro's Downing-Faircloth, there is much talk among end users about the desirability of being able to tap into corporate data bases and manipulate the data for graphics applications. For those who do not want to invest in high-priced output devices for high-caliber graphics, IDC's Kelly noted, there are networks on which data can be transmitted to a publishing center for output on high-quality devices at rapid rates.

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verter), just as if it was a standard IBM printer.

The MID-PILOT is compatible with the IBM main-frame systems 43XX and 50XX. The plotter is a Hewlett-Packard 747X A or 7550 A. The MID-PILOT is a program collecting the output files from the IBM graphic system (GDMM) and converting them into the HP plotting commands. The converted print file can be transferred to the plotter via a spool system. All the GDMM applications, e.g. the Chart Utility, the Graphplot, and the PGH are compatible with the MID-PILOT.

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SPECIAL REPORT

A guide to presentation-perfect graphics

By Lola Carducci
Special to CW

All of us have been to presentations where slides and graphics are used to show off the presenters' products and ideas. The means of delivery may be good, but how many of these conferences have you gone to and thought to yourself, "What are they trying to say?"

After all, the reasons we use graphics are to make our data clear, easy to read and understand. We want to hold and attract the attention of our audience, transform our data into information that people can use. If you use some common sense and the following tips, good graphics can be the positive results.

- Make the axis labels and numbers large enough to be read easily. This is especially true if you have a large audience.

- Use scales that will make interpolations easy. For example, number the axes in increments of fives, 10s or 100s, not sevens or 18s.

- If you are using multiple charts, use the same scaling to make comparisons easy.

- Unless you want to emphasize a data value, keep the annotation outside the chart.

- If you are using a grid in your chart, watch the line weights. You do not want to make the grids more powerful than the actual data lines.

- When possible, include a zero value for reference.

- Try not to overnotate. The purpose of graphics is to get the information across in pictorial form.

- When using logarithmic scaling, make sure your audience is knowledgeable about interpreting log scales.

- When using bar charts, if possible, sort the bars by magnitude.

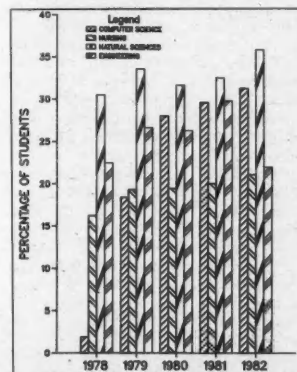
- Try not to use too many different shading patterns in bar charts; it could cause an optical illusion.

- Label all data sets.

Using color

When creating graphics, color is a big plus in highlighting critical data, enhancing visual contrast and conveying information quickly and efficiently. Studies have shown that executives prefer it.

Carducci is a senior computer systems training analyst at the management information center of Johnson & Johnson in Raritan, N.J.



Avoid using screens and patterns that confuse the eye.

There are also some important considerations to make when using color in your graphics:

- Select color combinations that are compatible. For example, avoid a yellow background with white lettering; it just cannot be seen.

- Use consistent color coding on all charts — that is, all labels in black, all titles in blue.

- Use colors and shapes that reflect their denotations. Use a red octagon for a stop sign, not a blue triangle.

- Use high-contrast colors for character/background combinations. On a white background, use black or blue lettering.

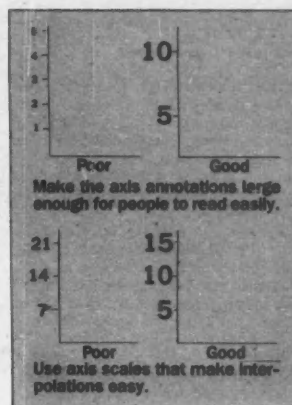
By following these simple guidelines, your graphics should come out presentation-perfect.

Graphics can lie

Also, be aware that you can use these guidelines to lie with your graphics.

Data can be hidden or slanted in your favor by using the guidelines in the opposite manner than was recommended.

For example, by making the axis annotation very small and the data a yellow bar on a white background, the person viewing the slide will be unable to make it out, particularly if he is sitting away from the screen.



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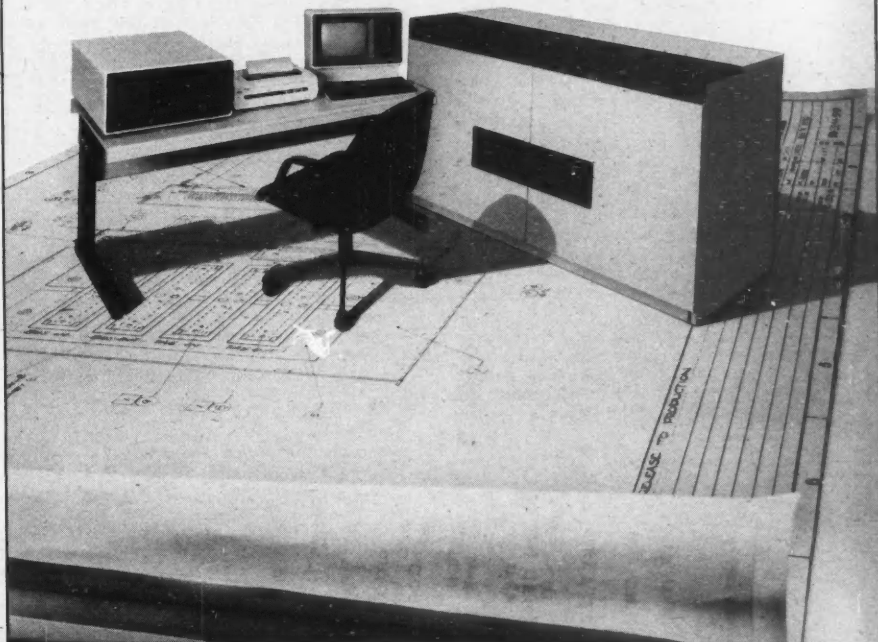
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SPECIAL REPORT

STANDARD from SR/2

GKS make this possible.

Another aspect of portability is device independence. This allows an application to use any of the supported display devices with the same high-level calls. Device independence is made possible by having the modular architecture hide the individual characteristics of the display devices from the application.

For software developers, the benefit of device independence is the ease with which new devices can be supported by the application. For end users, this means greater flexibility in choosing the display devices that can be used with the application.

The final aspect of portability is programmer portability. If the methodology used in creating graphics im-

ages is standardized, the portability of programmers from project to project is increased, and the cost of training is reduced.

The VDI defines the interaction between utility layers, like Core and GKS, and the various device drivers used to control output devices, like video bit maps and pen plotters.

The term VDI refers to the use of consistent, device-independent commands that control an idealized virtual device.

These commands are generated by the utility layer. Each physical device is supported by a device driver, which interprets the device-independent commands and maps them into the appropriate device-specific instructions required to generate pictures from the physical device.

VDIs can be used as building

blocks to develop additional utility layers. For example, an OEM or in-house development team may want to produce a set of custom routines that are optimized for a particular application. As long as these routines generate VDI commands as output, they can use all the device drivers that already exist for the Core or GKS system.

Another use of VDIs is in storing graphics images. These can be stored on disks as sequences of VDI commands, and a playback utility layer can then read the files and regenerate the images. VDI commands can be integrated with standard ASCII text to produce mixed graphics and text documents.

Users can also use their microcomputers as intelligent graphics terminals connected to remote hosts. The

problem is that various graphics protocols have arisen over the years to handle the transmission of graphics over communications lines.

MIS directors are faced with the problem of having to support all these protocols without wanting to place multiple dedicated terminals on their users' desks.

The solution is to use the microcomputer as a universal workstation — with software utility layers that allow it to emulate the various protocols.

The benefit of the VDI approach is that it provides an extensible graphics system. The system can be extended to include additional utility layers like Core or GKS or additional graphics terminal emulators like NAPLPS. It can also be extended to support new output devices like laser printers.

The VDI standard is currently being reviewed by the American National Standards Institute, and final approval is expected to occur late in 1985. In the meantime, various companies have implemented their own VDIs. While these differ from each other and will probably differ from the final standard, they serve the purpose of allowing vendors to implement extensible systems.

Until national standards are approved, the user should ask his vendor whether the vendor has implemented a system with a modular graphics architecture that incorporates the VDI approach. This ensures that the system can be extended to support the ANSI-standard VDI once it has been approved.

It is not clear which VDI will finally emerge as the official standard. But with VDI-based architectures, users and vendors gain adaptability and flexibility and an assurance that they can invest in graphics equipment without fear of obsolescence.

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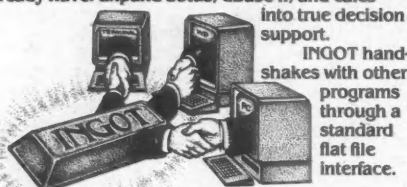
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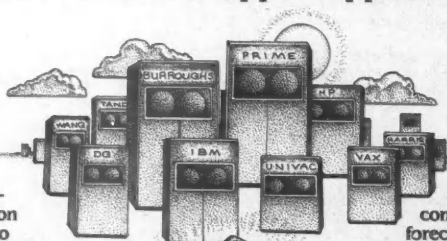


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within about 14 spaces of each other should be within the same text block. Two characters at diagonal corners of a single imaginary 3- by 3-character text block would result in a smaller byte count than if the two characters were in their own text blocks and similarly positioned. But a like arrangement of two characters in an imaginary 4- by 4-character block is best done as two separate one-character text blocks.

The NAPLPS standard includes the provision for incremental coding of points, lines and polygons as an alternative to the normal coding of graphics objects. The AT&T frame-creation terminal contains a soft switch that can be used to code completed designs using the incremental process. In complex designs, this can save hundreds of bytes. It is used at NBC Teletext as a matter of course. To some extent, continuing development of the entire teletext environment will increase the total number of bytes that can reasonably be used in a single page. New additions to the page management system at NBC Teletext will permit pages of up to 6,000 bytes. But until more scan lines can be used within the television signal, and until the decoders at television sets become more capable, realistic limits of about 2,000 bytes per page will be the rule. To be successful, artists and writers working on these systems will still have to become adept at balancing byte counts.

SPECIAL REPORT

Geographic data base, map display assist public utility

System devised to help water department maintenance crews locate clogged drains

PHILADELPHIA — In the older U.S. cities, the managers charged with keeping the physical infrastructure functioning are finding themselves being squeezed. On one side, real budgets for maintenance are shrinking, while on the other side, citizen needs for services remain at an all-time high.

In the Philadelphia Water Department (PWD), this dilemma is being met by using computer graphics to give operating personnel a head start on providing services and a tool to stop some problems before they start.

The PWD receives thousands of complaints each month about clogged storm-water inlets. The Inlet Cleaning Section of the PWD is charged with responding to these complaints, as well as with taking care of the scheduled cleaning and operation of the approximately 75,000 inlets in the city.

On any given work day, almost 50 crews are on the street solely for the purpose of keeping these inlets clear. Over the course of a typical year, the crews remove about 1.5 million cubic feet of debris. This requires a substantial investment in personnel and heavy equipment. Moreover, 75,000 inlets can cause a considerable liability exposure for property damage and personal injury.

Limited opportunities

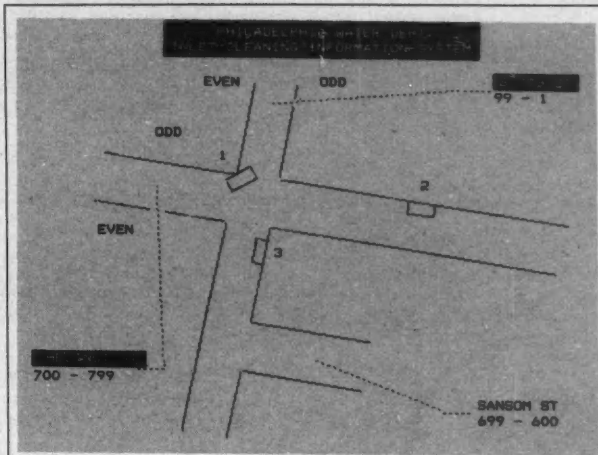
Because the number of complaints received is so large, the inlet cleaning crews have only limited opportunities to perform any regular, not to mention preventive, maintenance functions. PWD management realized that in order to make the inlet cleaning program more effective, it had to begin by making complaint handling more effective.

Before the computer-aided dispatching system was implemented, crews would be sent to an area in response to a complaint of flooding with only a general description of the specific location and would be instructed to clean debris from all nearby inlets. Generally, storm-induced flooding would have subsided by the time a crew reached the complaint location. As a result, much time was lost as crews positioned their equipment and excavated minor amounts of leaves and trash from inlets that had already drained quite adequately.

The department and its consultants devised a software package and a data base structure that uses computer graphics displays to get the crews to the right inlets, thereby minimizing unnecessary travel and setup. The software was developed by O'Day, Caruso & Prichard under subcontract to Temple University. It is written in Fortran and operates on a Hewlett-Packard Co. HP 3000, which the PWD maintains. The data bases are constructed using the HP Image data base utility, and the graphics are displayed on HP 2623A graphics display terminals.

Handling complaints

The system aids in handling the complaint from the minute a PWD telephone operator picks up the telephone, through to the foreman's scheduling of the work and dispatching of crews, up to the logging of



The Philadelphia Water Department's system provides graphics mapping of the entire city. Screen images of intersections provide information such as street names, the odd and even sides of the streets, the numbers of the houses on each block and the location of each storm drain.

work completed and the accumulation of a history of actions taken.

When an operator receives a complaint, the location is keyed directly into a screen form, either by the house number or by the pair of street names of the nearest intersection. The software displays the street layout at that location and shows the positions of all known storm-water inlets.

Using graphics to locate the desired facility is quicker and more reliable than using verbal descriptions, since the same physical location can be described in many different ways. Moreover, many city inhabitants have only a limited idea of how their block fits into the surrounding geography. An instant map display allows the telephone operator to ask the questions necessary to fix the exact location of the problem.

According to Nancy Brzyski, the PWD staffer responsible for logging complaints and updating the files, "Usually the caller knows pretty well what he's talking about, but pretty often you have to ask some questions to narrow down the problem to the right inlet. If you can't do that with the person on the phone, there's just no way that a crew is going to be able to find it [by] driving around. The map is a big help in asking the right questions."

Details about the problem can be entered, and the complaint is logged into the system. The system tells the operator if there is already a complaint logged against that inlet, thus preventing any duplication.

Saves effort, paperwork

This feature in itself saves a considerable amount of effort and paperwork. The system enables a foreman to assign work to crews, print work tickets and log work completed into a history maintained for each inlet.

According to Robert F. Serpente, chief water transport operations engineer for the PWD, "When you figure how much we spend in total on cleaning inlets and divide it by the

number of inlets we clean, you get an answer of about \$48 to clean just one inlet. A lot of that is [spent] just in processing the complaint and getting the crew and equipment to the right place and doesn't vary — no matter whether the inlet really needed attention or not. What we have done here is to get the men and equipment to the jobs that really need doing."

The screen graphics display is made possible by a data base that was constructed specifically for this purpose. It has two sections: the geography (such as street names, house number ranges and intersection information) and the facilities detail (the master record for each inlet itself). Each inlet is associated with both a street location and a street intersection, allowing the software to retrieve all inlets associated with any location.

The geographic data base was constructed by modifying and restructuring the street and address information available from the Geographic Base File/Dual Independent Map Encoding (GBF/DIME) file produced by the U.S. Bureau of the Census. These files are available for the urban areas of every major city in the U.S. and contain one record for every segment of every street.

The file for Philadelphia was processed and restructured into a more usable form, allowing retrievals by street name and address as well as by street intersections. It was also enhanced with coordinates for curb-line locations to allow a more accurate graphical presentation of the data.

The inlet facilities data base was coded from paper records that the department had collected. The coding was simplified by using the geographic data base to produce the coding forms already filled in with street name and house number information. In this way, the information being coded was automatically associated with the proper street location and intersection.

Production use of the Inlet Cleaning Operations and Information Sys-

tem began with one pilot area in July 1983. Inlet cleaning personnel use it to log and track over 100 complaints a day and now have information concerning the location and history of each facility.

According to William Price, a PWD district foreman, "[It took] quite a lot of getting used to at first, because none of us had ever worked with a computer before. It took a little while to get the hang of scheduling work on a screen instead of shuffling a stack of paper tickets. But once I got used to it, it made it easier to keep track of where the men are, since the computer makes me up a list each morning."

"Used to be, I'd have to write that all up by hand — every detail about every complaint. [Now] it's easier at the end of the day [to check] what they have done. I can just go write the list in the computer and check off everything that was done."

Brzyski said, "The computer has brought more of the decision making into the office. We didn't used to have any way of telling whether a complaint was accurate or not. We just gave it to the foreman and let him worry about whether it was work that needed doing or whether the location even made sense. I've now got the information on the computer that lets me screen the complaints as they come in."

"While this has certainly not simplified things in the office, we do know more about what is going on, and it is good to be able to tell a caller that their complaint has been logged, or that a crew took care of it already without having to take time to go to the files."

"We're definitely getting the complaints out faster. Complaints now are always ready for the foremen to schedule the same day. It used to take at least two days, sometimes three, before the paperwork was in the foreman's hands," she said.

Other projects started

The success of using graphics displays and a geographic data base led the department to initiate other projects. A similar effort is now nearly complete to automate the work order processing of the crews who provide the repairs to the storm-water inlets: masonry, excavation and so forth. While the graphics functions are similar to the inlet cleaning system, this system ties the geographical location of the facility to many more types of possible activities, as well as accounts for the materials used in the repairs.

An even more ambitious and comprehensive project is now in the final design stage. This system will automate the dispatching and record keeping for the crews who perform repairs on the sewer pipes buried in the streets. Its graphics display will show the locations and characteristics of the pipes in a street and will assist in dispatching the proper crews with the right equipment and materials in a timely fashion.

As the benefits of spatially oriented data bases of facilities associated with geography have started to be realized, other divisions have also initiated programs to track activities for such facilities as water mains and fire hydrants.

SPECIAL REPORT

Automated slide system helps bank project proper image

BOSTON — When you are the largest bank in New England and one of the top 20 in the U.S., with over \$18 billion in assets, how you present yourself graphically — to the business community at large and to your own staff — becomes of paramount importance.

The Bank of Boston met this challenge in part via a computerized slide system. The system satisfied the bank's need for highly individualized presentation slides — that were as professional-looking as they were economical — and slides that reflected in quality and aesthetics the bank's status as one of the nation's

leading financial institutions.

The bank decided on a system called the Magi Major Leaguer, originated and manufactured by Mathematical Applications Group, Inc., of Elmsford, N.Y.

"We turned to the Major Leaguer because we wanted more control over creativity, production and costs," said Kathy Whittemore, who is a public relations officer in the bank's Corporate Communications Department. "The system gave us the versatility and speed to produce custom-designed slides at a price we couldn't duplicate using tra-

ditional outside sources," she added.

The system enables bank users to design slides at a computer terminal, to display the images on a CRT terminal, to send slide data via modem to a regional production center and to receive finished color slides back in 24 hours.

Before the Major Leaguer was installed late in 1982, the bank had been a modest user of presentation slides, most of them prepared by design studios. Whittemore said the bank today produces 100 to 200 computer-generated slides a month.

Senior management, she said, often use the slides to highlight business analyses for internal needs, while other slides may be used to interpret statistics for external presentations.

Slides are also produced for the bank's annual meeting, as well as for marketing meetings held for marketing officers.

"We have actually produced slides for reproduction in our annual report and then displayed those slides at stockholder meetings," Whittemore said. "The Major Leaguer system has provided continuity of design and visual impact — which is an important component in our overall communications program."

With a background in public relations, advertising and art history, Whittemore has turned the slide system, she said, into very much "a tool

of the imagination" that has taken the system beyond its standardized formats.

"It's not uncommon for us to use the system to create images of our bank building, maps of the U.S., logos and other symbols that we integrate, in turn, into the slides," she said. The elements are stored in the system's electronic library and can be recalled, changed in size and color and repositioned as needed.

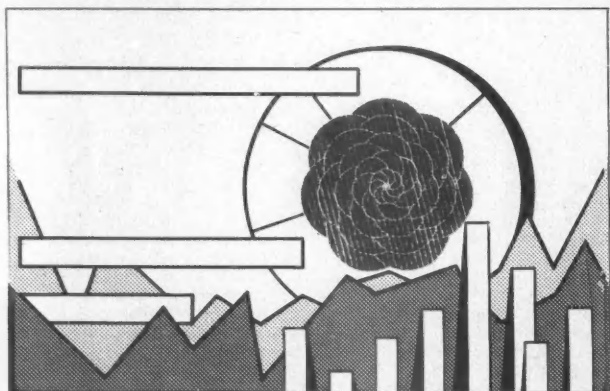
Freedom to make custom designs

"The nice thing about the system," she said, "is that you can throw in as many special effects and symbols as you want for essentially the same price as the standard formats. It gives us the freedom to create custom designs that have an identity all their own."

For technical advice on carrying out some of her design ideas, Whittemore calls the Major Leaguer Hot Line, a support service based at the same regional production center at Mathematical Applications' corporate headquarters in Elmsford, N.Y., that processes her slides.

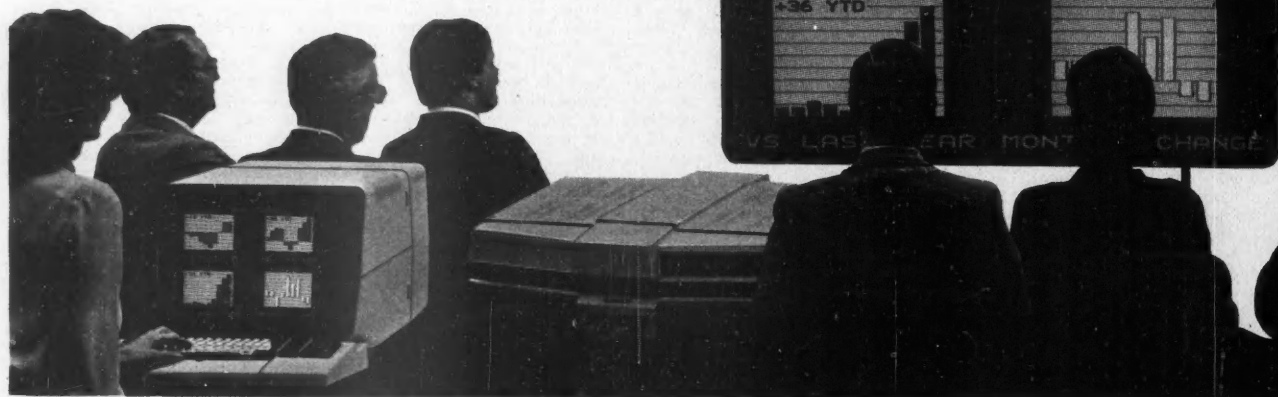
The hot line is an important aid, she said, especially in tight-deadline situations.

"People at the bank like the quality and strength the Major Leaguer brings to their presentations," she declared. "It has markedly increased our use of slides, and I expect we'll expand our use in the future."



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SPECIAL REPORT

Computer-crafted slides prep photo firm's salesmen

PARAMUS, N.J. — It seems only natural that a photographic products manufacturer would use slides to provide technical product knowledge, sales skills training and marketing information to its sales representatives.

Ilford, Inc., based here, uses slide shows, and it creates sales aids and marketing materials, such as overhead transparencies, brochure illustrations and sales organizers, by enlarging and duplicating the color slides.

"Photographic slides are the logical choice for a photographic company to launch new products, train newly hired sales representatives and make presentations at national and regional sales meetings," said R. Charlene Castello, Ilford's training manager.

Castello's slides are generated on computer graphics systems at Geniographics Corp.'s New Jersey service center in Florham Park, N.J. Geniographics, a manufacturer of computer-slide-generating equipment, operates a nationwide network of 23 service centers that provide design, consulting and production services.

According to Castello, Ilford does not have the volume to warrant the installation of an on-site computer graphics system. Since 1980, an estimated 20 slide programs and a total of 1,000 slides have been produced. The largest production — the introduction of Ilford's Ilfospeed Multi-

grade II black-and-white printmaking system — required 300 slides.

"Computer-generated slides show our products to their best advantage," Castello said. "The slides enable us to communicate complex, technical information in a simple, straightforward manner and in an interesting manner; something that captures people's attention; something that leaves a very permanent, visual, memorable image in their minds, so that whenever they think of self-masking or developer-incorporated paper, they'll always think of our message."

Ilford, established in 1956 and based in Paramus, N.J., is the U.S. marketing operation of the Ilford Group, a worldwide producer of photographic products and a division of Ciba-Geigy, which is a \$6 billion Swiss chemical and pharmaceutical company.

Training programs introduced

According to Castello, formal training programs were first introduced at Ilford in 1980 to support expanding product lines and a changing photographic market. "Ilford has moved from being a supplier of film, paper and chemicals to a systems approach where we provide a total package to a customer, from sensitized products and chemicals to enlarging and processing devices."

Ilford's sales force is structured to meet the needs of the various seg-

ments of the photographic market. Manufacturers' representatives sell the company's products to retail camera stores for sale to photo hobbyists. District supervisors sell to dealers who address the needs of corporate in-plant photographic facilities. Technical sales representatives sell in the traditional and professional markets of custom labs and photo finishers.

Within the past three years, Ilford expanded its sales force by creating a new sales group: equipment applications specialists. These specialists sell the company's new lines of equipment, including the Cibachrome Copy System and the Cibachrome Print Center, to in-plant labs and retail photographic copy services.

As the sales force evolved to meet the demands of an increasingly competitive and complex market, Ilford's training programs similarly evolved.

"We now have to provide comprehensive, technical product knowledge — what the product is, what the product does, how it works," Castello said. "But it's not enough now to be able to talk about the technical features, such as the contrast range of a paper."

"Now, we have to develop the benefits for the customer. So we have to provide sales skills training: selling those strategies for a product that address what the product can do for a customer technically and financially, in terms of the return on in-

vestment, the economics, the cost savings, how the product will cut down on reprints and paper waste — aspects that give the customer a competitive edge."

In addition, Castello said, when launching new products or training members of the sales force, "we also ensure that any product information and training is consistent with the company's market strategies for that product."

Range of colors, symbols

With the Geniographics systems, Castello said, she is able to use a range of colors and symbols. Geniographics' systems currently feature a selection of 16 million colors. A data base stores more than 2,000 standard illustrations and symbols, ranging from photographic to data processing artwork, as well as special effects, such as multiple-drop shadows.

Using the system, Castello said, she is able to create "anything Ilford needs, no matter how technical. We have created cross-sections of papers and films, displays of what happens during a specific copying or developing process, pictures of enlargers and other equipment."

Castello noted that in many instances, the Geniographics slide is not the final product that Ilford uses. Using its Cibachrome copy system, Ilford produces color overhead transparencies and color prints from the slides.

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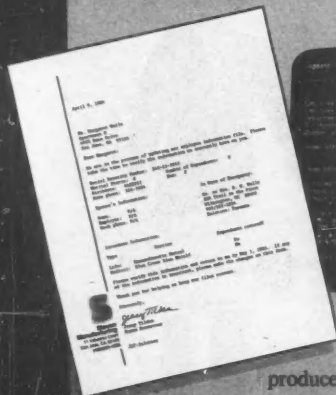
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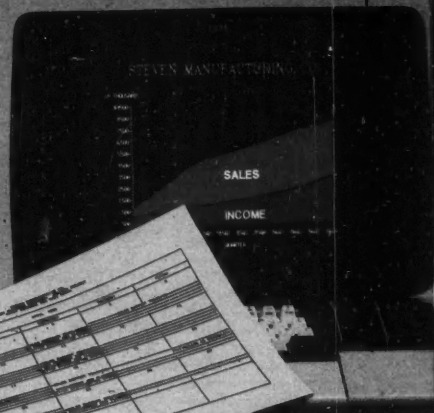
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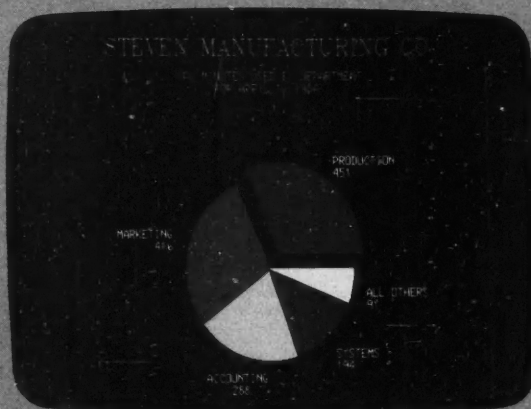


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Flexibility, economy move mouse ahead of the pack

By Albert L. Whetstone
Special to C/W

For those who have never tried, a word of caution: Drawing pictures with a keyboard is very difficult.

Some seers are saying that by 1990 one in every two or three office workers will have his own computer. The trend toward this has brought about, and will continue to be the driving force behind, a dramatic change in the approach to the design of computer software applications. It will also be the major force behind a more dramatic change in the design of interfaces between software packages and the people who use them.

The argument that the alphanumeric keyboard is the most heavily used device and, therefore, any other device (joystick, mouse, touch pad or what have you) is supplementary is a flawed argument. We already have applications and programs in which the "supplementary" device is the dominant tool.

Three types of mechanisms

The mouse and the touch pad enable us to use gesturing and interactive mechanisms that have been classified as three types:

The first type has been called a "pick" or "select" mechanism. It enables us to select something. That something may be a piece of data, an area of the screen, a token or an icon, or it may be a function designator.

The second type is used to "place" or "locate." That is, one can locate a region and use that located region either to place something or to concentrate further the user's and the computing mechanism's attention on it for subsequent activity.

The third mechanism has been called a "value" or an "evaluate" tool. Value is the determination of XY coordinates on the display screen or on the corresponding logical plane to which the picked or placed information is to be associated.

Several years ago, a systematic evaluation of the various auxiliary devices indicated that the mouse could outperform all others for the three operations listed. It is fast, accurate and natural to use. It provides feedback that is superior to that of a joystick or a trackball, and it offers a means of gesturing that is less tiring, faster and more accurate than the touch screen or light pen.

The first generation of mice, introduced as long ago as the late 1960s, was mechanical. The earliest mechanical mice had two wheels that were mounted at right angles and rolled along a desk surface. Each wheel turned a potentiometer. In the 1960s there were no analog-to-digital converters on a chip costing a few dollars, so the interfacing was expensive.

The next mechanical approach was to sense the mouse movement by use of a ball that rolled over a table surface. As the ball moved, it rotated rollers inside, which turned shafts. The shafts, in turn, were attached to optical or mechanical encoders.

The output from mice using encoders is typically in quadrature.

Whetstone is chairman of Display Interface Corp., a Milford, Conn.-based manufacturer of computer peripherals.

Since no computer uses a quadrature input, some sort of interface for conversion is required. The resolution of this mouse is 200 count/in., which is relatively good, compared with the next type of mouse.

The optical mouse is a fairly new device. This mouse is restricted to traveling around on a pad because it uses an LED to track its position. It decodes reflected light from the pad, which contains colored lines. The reflected light is received by a four-quadrant photodetector and is then processed by the mouse's microprocessor to determine distance and direction of movement. The mouse pad consists of a highly reflective

material printed with grid lines of nonreflecting ink.

A third type, the acoustical mouse, has recently been introduced. To understand its method of operation, consider rubbing a paper clip or a pen or any other object across your desk. It will make a sound, the amplitude of which is dependent upon velocity and the duration of which is dependent upon the distance of travel. Inside the object that you rubbed on your desk there are, of course, minute strains, and these can be measured to determine direction. With the acoustical mouse, you are measuring vector distance and angle, which are then converted to XY coordinates.

The microprocessor that does the conversion also calibrates the scale factor. This mouse, like the optical mouse, is all solid-state.

The acoustical mouse is relatively independent of the surface on which it runs. The sound pickup consists of a suede pad on the bottom and a piezoelectric transducer, so that the acoustic pickup from the surface depends more on the suede material than on the texture of the surface.

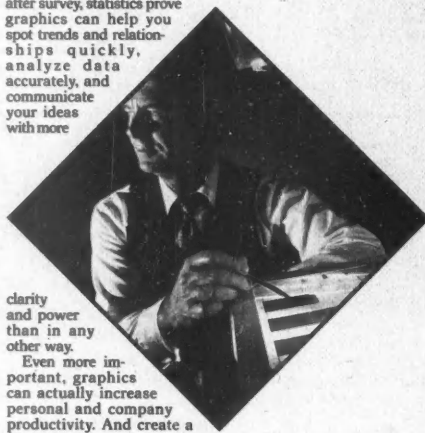
The advantages and disadvantages of the above technologies may be cocktail party talk for some time, and, in fact, each method may have advantages that are specific to a given application.

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- The decision process was accelerated: 64% of study participants said they made their business decisions immediately after the visual presentation. When overheads were not used, the control group said they delayed decision-making until some time after the group

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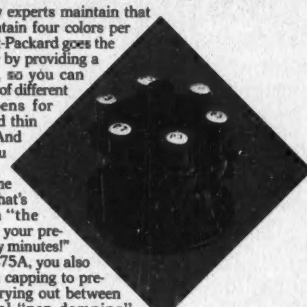
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Your choice: 2 paper sizes and today's most popular graphics software packages

While most professional business applications will be satisfied with standard 8½ x 11" paper or transparencies, the HP 7475A adds the



SPECIAL REPORT

Mechanical, optical and acoustical mice: a comparison

Below is a comparison of some of the characteristics of the mechanical, optical and acoustical mice discussed on the facing page.

■ **Noise.** Mechanical mice, by virtue of being mechanical and having a large, heavy ball in their bases, produce noise when they are rolling along a surface, unless they are given a special surface such as a sponge pad, but this is a restricting disadvantage. Optical and acoustical mice both have a felt or suede belly and produce imperceptible noise.

■ **Dirt.** Mechanical mice, having a ball that rotates on the surface, tend to pick up dirt, fragments from erasers and grit. The pad on which

optical mice work can be cleaned with ordinary window cleaner, but it is susceptible to scratching. Although acoustical mice have only recently been introduced, they do not seem to be sensitive to dirt.

■ **Special pad.** Mechanical mice can work without a special pad, although on smooth surfaces such as desk tops and Formica they tend to slip, and therefore closure is not achieved (that is, a circle does not end where it started). Optical mice need a special surface with inked lines. Acoustical mice will run on virtually any surface, whether it is a wooden or Formica desk or someone's lap.

■ **Intelligence.** Most mechanical mice have no built-in intelligence. They pass out quadrature signals from an encoder and require intelligence in an interface. Optical and acoustical mice require microprocessors for their operation, and therefore the same microprocessor is used to program the protocol and the format. They can output real numbers that require no further burden of boxes or interface boards. Optical and acoustical mice usually use an RS-232 interface. They can be programmed to run their own diagnostics or respond to commands from a computer.

■ **Costs.** Although mechanical

mice do not have built-in intelligence, it seems that those capable of good resolution and linearity, just by virtue of being mechanical, have no cost advantage over optical or acoustical mice.

■ **Resolution.** The optical mice that are currently being produced have a resolution of 100 count/in. One of the forefronts of information display technology is high resolution, and it will probably not be long before mouse resolution finer than 100 count/in. is required. Some mechanical mice do provide 200 count/in. Only the acoustical mouse is capable of going to extremely high resolution — 1,000 count/in. or more — and the required resolution is programmable. It is also not easy to select a single pixel from the display screen with the optical mouse technology. With the acoustical mouse, it is possible, although on high-resolution screens very careful operator attention is required.

■ **Durability.** It seems that all three mouse technologies offer durability of several hundred miles of operation, although the caveat of susceptibility to dirt does apply.

■ **Touch pad.** For the touch typist, it is frequently not desirable to go off a board to grasp a device such as a light pen, a digitizer stylus or a mouse. Acoustical mouse technology has been converted into a touch pad that is included on a keyboard and can readily be stroked without the necessity of leaving the keyboard. The touch pad's resolution and repeatability are the same as the mouse's. The conversion is easy: The mouse is turned upside down so that the sensitive surface is level with the keyboard, and the sensitive surface is made the proper area for the touch pad. This conversion is not possible with mechanical or optical mouse technologies.

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Mouse emerging from its hole

After the mouse was introduced in the 1960s, it languished for about a decade. Four elements had to be present simultaneously for the mouse to become a ubiquitous tool for interaction.

First, it had to achieve some recognition. This it has certainly done, with feature articles in *Time*, *Business Week*, the *New York Times*, the *Wall Street Journal*, *Fortune* and many trade journals and newspapers.

Second, with the introduction of small, special-purpose computers and workstations, the cost and performance advantages had to be achieved. The mouse is certainly more economical to produce than most other auxiliary devices, and it has proven to have performance advantages.

The third element was vendor support, which we have seen from leading suppliers of small computers.

The fourth element that had to be in place was third-party software and application support, and this is being provided by large, established software houses and hundreds of bright, young entrepreneurs.

Study: Decisions based on graphics may be faulty

MINNEAPOLIS — Is a picture worth a thousand words? Is one worth a hundred numbers?

Probably not, according to research results from studies that were conducted at the University of Minnesota here on the use of business graphics.

Minnesota researchers have discovered that managers using graphics rather than tabular data perform poorly on many decision-related tasks.

Furthermore, they have evidence to suggest that what is done with the graphics makes a difference on how effective they are. Results show that graphics are very good for trend

spotting, but not that good, apparently, for interpreting data, such as on financial reports.

Some other findings

Some of the other things that came out of the managerial graphics projects conducted by the Minnesota researchers are:

- People, when confronted with a set of data that should be graphed in order to use it effectively, do not take a graphics approach.

- In fact, without a nudge toward graphics, only about 3.5% of people will graph when they ought to.

- Use of graphs does not help people find business problems.

- Use of graphics does help people forecast accurately. Furthermore, forecasts based on graphs have significantly less variability among forecasters than when tabular data is used.

- There will be a moderate, but not explosive use of managerial graphics by business in the next few years.

- A major limitation of current business graphics systems is their inability to link into centralized organizational data.

- How graphs are drawn, their quality, scaling and accuracy makes a difference on their effectiveness in supporting analysis and decision making.

The Managerial Graphics Project is a major activity of the Management Information Systems Research Center within the graduate School of Management at the University of Minnesota.

The project involves survey, field and experimental research. In the past year, four graphics experiments were conducted involving hundreds of manager and student subjects.

Mail survey conducted

Another major activity was a mail survey conducted in association with the Society for Information Management and the Center for the Study of Data Processing at Washington University in St. Louis.

The results of the survey, to which over 200 firms responded, is the best current picture of how organizations are currently using business graphics and how they intend to use them in the future.

One hundred and sixty-three of those responding to the survey had experience with business graphics; one organization had utilized the tool for 25 years. The major users of graphics are the functional areas of finance and marketing and the information systems organization itself.

Users 'somewhat' satisfied

These users, in general, are only "somewhat" satisfied with currently available graphics hardware and software. Only about 12% of the organizations responding have formal plans for computer graphics.

The Minnesota researchers intend to follow the initial mail survey with in-depth interviews with large and innovative users of business graphics.

In addition to an ongoing experimental research program, the project is planning to host a conference on the topic of managerial graphics to be held in the spring of 1985 in Minneapolis.

In addition to studying the current and expected use of business graphics, the Minnesota project will address further questions, such as:

- What activities do managers and professionals have in their jobs for which graphics will be useful, and what properties of graphs are most effective for each activity?

- How does the use of graphs for communication and persuasion differ from the use of graphs for analysis and decision support?

- Can we develop any graphics standards regarding properties such as use of colors and bars vs. pies vs. lines, scaling, default options and nontraditional graphics — icons and Chernoff faces, for instance.

- How can large-screen graphics be best used in group settings?

It is expected that the Managerial Graphics Project will be an ongoing activity that will last for several years.

More information about the project can be obtained from Prof. Gary W. Dickson, Minnesota Managerial Graphics Project, MIS Research Center, School of Management, University of Minnesota, Minneapolis, Minn. 55455.



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SPECIAL REPORT

Navy enlists war game simulator in training effort

Battle situations created by computer allow tactical analysis at little expense

SAN DIEGO — This isn't exactly a video arcade the U.S. Navy is running here, but naval officers are playing these computer games as if it were a matter of life and death. For quite some time, computers have been playing an increasingly important role in the military. Battle simulation is one area in which they are particularly useful, allowing analysis of the cause and effect of every action within an entire theater of operations. Perhaps of greater importance, simulations are far less expensive to stage than the real thing.

"The U.S. Navy can no longer afford to fund the kind of large-scale exercises necessary to train senior officers in battle group tactical situations," explained Lt. JoNeil Miettinen, deputy program manager for the Naval Warfare Interactive Simulation System Development Program.

"There are also capabilities problems in the physical exercise," she continued. "For example, our P-3 patrol aircraft just cannot realistically duplicate a Soviet Bear aircraft. With computer simulation, however, we are able to achieve a significant amount of realism, often to the point that war game participants forget that it is a game and actually begin reacting as if it is a hot war."

'Ultimate computer game'

"The ultimate computer game" is how senior Navy officers described the Interim Battle Group Tactical Trainer (IBGTT), one of the latest of these military war game simulators that use computer graphics displays to update players on the tactical situation. Brought on-line in January 1983, the IBGTT represents over 18 months of research and development by civilian and naval engineers and programmers from the Naval Ocean Systems Center (Nosc) here.

The Nosc facility is one of the Navy's laboratories for R&D in weapons and command, control and communications. To support tactical training for the fleet battle group staff, IBGTT software was developed to provide realistic battle experience — battles complete with weather hazards, submarines, aircraft, con-

ventional and ballistic missiles, false sonar targets and electronic countermeasures.

The IBGTT software provides participants with a three-sided interactive scenario in which opposing sides are able to define, structure and dynamically control their forces.

Each side is provided with its own view of the world, a view that includes a data base describing the current tactical situation. Each side's view of its own forces is current and complete. Its knowledge of the other forces involved, however, is based on data provided by its sensors, such as radar, and on communication with other sources.

The war game software package consists of eight programs, three of which are concerned with system communications. The remaining five — Build, Force, Wargame, Wargame Control and Post Game Analysis — handle the game itself.

■ Build enables participants to create, change, add or delete platform, sensor and weapons characteristics by entering orders through a command-center terminal.

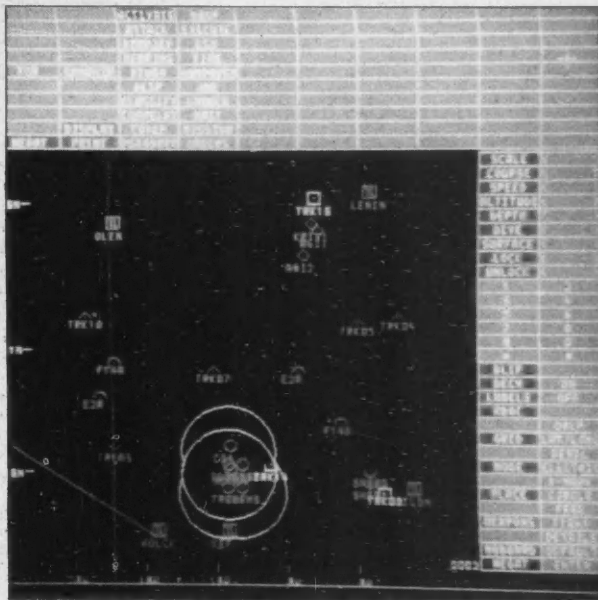
■ Force enables participants to create, change, add or delete elements, element dispositions, environments, operating policies, procedures and capabilities of a scenario by entering orders through a command-center terminal.

■ Wargame executes the war game scenario, which was created by the Force program and populated by the Build program, by implementing software models and algorithms in accordance with student, instructor and operator inputs.

■ Wargame Control coordinates and controls all the processes executed concurrently on the system during a game.

■ Post Game Analysis processes data collected during a game to measure the effectiveness of the tactics displayed during the game.

The simulation programs were developed on Whizzard 7200 graphics systems from Megatek Corp. The systems are used in the simulators with Megatek's Wand software-support package.



Naval officers training in battle group operation decision making use this menu and display of the tactical positions of their forces in a battle simulation game.

The IBGTT software is supported by Nosc's Computer Support Facility (CSF), which consists of a pair of Digital Equipment Corp. VAX-11/780 minicomputers driving eight command centers. The two computers are each equipped with 8M bytes of core memory and share an additional 4M bytes of memory. This arrangement provides the CSF with a total of 20M bytes of memory and enables each computer to address 12M bytes. The CSF is also equipped with 1G byte of disk and tape mass storage.

Each command center contains a Megatek 19-in. color Whizzard 7250 computer graphics system that displays the current geotactical situation; four to six monochrome alphanumeric monitors, each of which can display any one of 21 status boards, such as air activity or the electronic countermeasures taken; an I/O terminal for communicating with the system; and an off-line internal communications system that simulates voice radio during the exercise, but is not in communication with the simulation computers.

During a typical exercise, five of the eight centers are assigned to the participating warfare commanders and coordinators for air, submarine and surface warfare and electronic countermeasures. Each of the command centers can run its own war game simulation independent of the other centers.

One of the three remaining centers is assigned to the enemy commander and another to the tactical officer in charge of the exercise. The eighth command center functions as central control, with its operator serving as the war game umpire, with complete and current knowledge of all the forces involved. The umpire also controls the actions of a third, neutral force. The data available to each center is continuously updated by the computers to ensure that the partici-

pants make their decisions based on the latest geotactical information.

Geotactical information is displayed on the Whizzard 7250 with friendly forces shown in blue and the enemy force in orange. The graphics system includes zoom capability for close-ups of the tactical situation. A menu presented on a display screen provides the participating officers with a color-coded listing of all available information query and command possibilities, from determining the position of ships to loading weapons on aircraft. Participants can select items from the menu through the Whizzard's graphics tablet.

In addition to the Whizzard 7250 color graphics terminal in each command center, there is also a large overhead color screen for general viewing. This display, a Lightvalve from the General Electric Co. Video-display Equipment Division, measures six feet on a side, enabling participants not actively involved to follow the action. The large-screen projection is driven by red-green-blue cables directly from the Megatek 7250 graphics system.

Gauging effectiveness

In order to determine the effectiveness of the tactics employed during the game by the participants, every significant position, threat, surveillance and communication is recorded.

Postexercise analysis provides a measurement of effectiveness that is used by fleet staff personnel to evaluate and critique individual and group performance. Among the criteria used in the evaluation are the location and status of all friendly and unfriendly forces and crossings of critical friendly thresholds by unfriendly forces.

Weight is also placed on how effectively friendly forces kept the unfriendly force under surveillance.



Officers at the Naval Ocean Systems Center in San Diego use both a conventional plotting table and a joystick-controlled Whizzard 7200 system as their command center for a battle simulation game.

SPECIAL REPORT

Departments of transportation use interactive graphics

Survey researcher expects three-quarters of states to have systems within two years

By John Desmond
CW Staff

AUSTIN, Texas — A survey that studied interactive graphics systems at state departments of transportation, conducted by a consultant here for the second successive year, shows that 18 states have systems and 15 are planning to buy one within a year.

This compares with 1982 figures that showed a total of 14 state transportation departments were using interactive graphics systems and 16 planned to acquire a system within a year.

Eleven states replied in the 1982 survey that they had no plans to investigate the use of interactive graphics. Only one state, Connecticut, answered in 1983 that it would never investigate the use of interactive graphics systems.

"If things continue going the way they're going, within one or two years three-quarters of all the states will have interactive graphics," predicted Thomas M. Rioux, president of Rioux Engineering, Inc., who conducted the 1982 and 1983 surveys free of charge as a member of the Transportation Research Board of the National Academy of Engineering.

Fifty-one responses were received to the 52 surveys that were sent to the 50 states, Washington, D.C. and

Puerto Rico. Puerto Rico did not respond. The state with the most interactive graphics experience is Mississippi, which obtained a system eight years ago. Michigan, New York and Texas each have had graphics systems for seven years, and Florida has had one for six years. All the other states with systems have had them for four years or less.

The primary interactive graphics applications within state transportation departments are drafting and mapmaking, the 1983 survey showed.

Most applications in 1982 were in roadway design, drafting, mapping, bridge design, accident analysis and traffic analysis and for planning mass-transit systems.

Productivity increased an average of 3.3 times in departments with interactive graphics, the survey showed. This productivity increase practically justifies the cost of an interactive graphics system, in Rioux's view. However, productivity in 1982 was shown to increase an average of 4.4 times for all applications, slightly more than the 3.3 average of the 1983 survey.

The average investment per CPU in 1982 was similar to 1983 — slightly less than \$1 million per user — but by 1983 a total of \$35 million had been spent by states on turnkey systems, the survey showed.

Money flowing into the states for highway work as a result of a 5 cent increase in the federal gasoline tax, which was put into effect recently, may be encouraging states to pursue interactive graphics, Rioux suggested. The state of Texas, alone, has nearly \$1 billion to spend annually for highway construction and maintenance.

Interactive graphics is also causing states to look at different options in design, the survey showed, and that often leads to a lower construction cost, Rioux said.

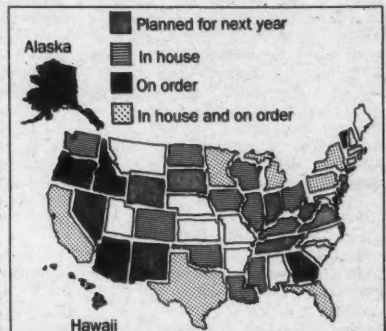
The most popular system at state departments of trans-

portation is the Intergraph Corp. system, which is used by 12 states. The next most popular is an IBM mainframe system used by five states.

Because the most frequent question Rioux is asked by states interested in getting a system is how big it should be, much of the survey details the size of states' systems.

In the 17 states that have 32-bit CPUs, an average of 1.6 CPUs was involved in supporting or driving interactive graphics terminals; in states with 16-bit CPUs, the average was 1.3 CPUs. Average memory per CPU was 1.5M bytes for 16-bit systems and 3.9M bytes for 32-bit systems. The number of tape drives averaged 1.77 per user and 1.08 per CPU for all respondents.

The total number of plotters averaged 1.78 per user and 2.41 per CPU. The total number of line printers averaged two per user and 0.89 per CPU. The average number of links for states with more than one interactive graphics CPU was 3.2 per user and 0.5 per CPU. States linking interactive graphics CPUs to other graphics CPUs averaged two links each. Only one state reported having a lo-

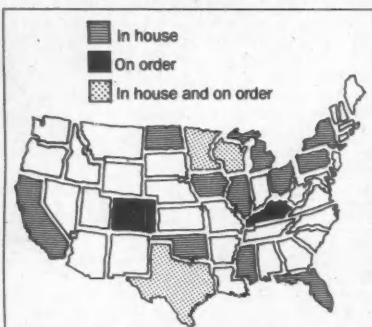


1983: Graphics systems owned by state transportation departments

cal-area network.

The average number of hours per day that the graphics terminals are in use ranged from six to 11. Sixty percent of those responding were using data base management systems along with their graphics systems. Most states were running jobs other than graphics on their interactive graphics CPUs, including interactive engineering applications, batch engineering applications and interactive text processing.

The survey is available free from Rioux Engineering, 6202 Lost Creek Circle, Austin, Texas 78746.



1982: Graphics systems owned by state transportation departments

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Mapping system helps insurance firm assess its markets

COLUMBIA, Mo. — Executives here at Shelter Insurance Co. of Missouri are now using a custom-tailored marketing management information system to develop and present market research analyses.

The system integrates corporate information, statistical models and mapping procedures. Shelter's marketing system allows nontechnical managers to produce reports and maps for reviewing corporate performance, portraying geographical areas that meet particular criteria and identifying areas that offer new business potential.

In choosing the software for the marketing management information system, Shelter looked for a package to operate on its IBM 3081 computer. The system was finally designed with the base SAS, SAS/Graph and SAS/FSP products from SAS Institute, Inc.

Mapping capabilities

The SAS system was selected because, according to Shelter management, it provides extensive mapping and statistical capabilities. Combined, these capabilities help analysts and managers work together to understand Shelter's business environment.

The three products also help generate ideas for marketing alternatives used to adapt to that environment.

The foundation of Shelter's marketing system is a marketing research data base, consisting of two SAS data bases. The two data bases contain summary information from the company's detailed policyholder files: one data base for the current year and one for the previous year. Files from the two data bases are merged for analysis. Also included in the marketing research data base are demographic data, pricing data for Shelter's top competitors and summary data for savings and loan institutions.

Map data sets

Projected SAS/Graph map data sets contain coordinates of polygons for states, counties and sales districts and the names of counties and other places that would be used for labels on computer-generated maps. All programs in the system are written in the SAS language so that nontechnical managers can maintain and modify them without help from data processing professionals.

The marketing system also incorporates statistical models, consisting of a series of SAS macros that are structured to perform analysis. These models are combined with SAS/Graph procedures to produce territorial maps. The system has the ability to shade the maps to reflect how a particular area performs in comparison with expected levels. This capability lets managers compare their expectations with actual results.

"By analyzing and comparing plots for three variables [market penetration, company agent concentration and average agent productivity], we obtained new insight about the company's marketing position and the mix of marketing strategies we should consider to generate new business in different counties," said Vince Bartle, director of planning

and research. "Thanks to the SAS/Graph product, we can assess decisions involving an area with the company's total marketing strategy in mind."

In updating the data bases, comprehensive reports are produced periodically. These reports describe the current status of business activities in each geographical area and the changes in status from the previous year. The marketing system also produces reports that are flexible in content and format and maps that give a geographical perspective to an area's attributes. These capabilities allow Shelter management to

shift the focus from the entire marketing area to smaller segments.

The SAS macros provide users with outlines of computer programs written in a nonprocedural language. Modifications to the programs are effected by respecifying macros that define key parameters for SAS procedures.

For example, a macro can be invoked to direct the plot to a hard-copy plotter instead of to the user's screen. Thus, analysis can be performed at the terminal, prototypical maps and reports can be produced for study, and then hard-copy maps or reports can be directed to the company's printer/plotter or to its laser printer.

ser printer.

By subsetting the data set containing the variable to be mapped, the user can obtain maps of part of the geographic area. These can be magnified to fill a page of the prescribed size. Maps of the company's 13-state marketing area by county can be generated, then broken down by sales district. Maps of subsets of the area are automatically enlarged for detailed study.

With labels maintained on the SAS data sets to serve as headings for variables, reports are automatically formatted by the base SAS product to fit into the space that is available on a page.

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End-user business graphics calls for MIS attention

By Raymond E. Jacques
Special to CW:

Business graphics is already playing an important role in many of today's information systems departments. The explosive growth of business graphics technology and end-user computing technology will result in business graphics playing an even more significant role in the future. The information systems executive must plan effectively for business graphics support and growth.

End-user business graphics produces art that will be used for management reporting and presentations. These graphs will usually appear in the form of plots on paper, 35mm slides or overhead foils.

End-user graphics are generally created directly by the person who is going to use them. The graphs are usually created by a first-level professional or perhaps by a clerical person or a secretary.

End-user computing currently represents 10% of the typical information systems budget today. IBM and several consultants predict that by 1990, 80% of total information systems expenditures will be for end-user computing. Currently, business graphics at General Mills Corp., and probably at most large corporations, is the second or third largest end-user computing application. The role of business graphics will continue to grow, since graphics provide a very effective solution for management reporting and other business needs.

End-user graphics is also creating a demand for production graphics. Production graphics produce graphics to replace data processing reports that are usually generated on a high-speed printer. Managers are seeing how effective graphics can be, and they would like to use graphics as part of their normal reporting procedures.

Important issues

Some of the more important issues surrounding end-user graphics are:

- Why are end-user graphics so important in the first place?
- How much of a role should the information systems department play in end-user computing, including end-user business graphics?
- What are the application trade-offs of business graphics produced on the micro vs. graphics produced on

the mainframe vs. graphics produced via the various office automation tools that are available? Which one of these is better?

■ How do you effectively make the data on mainframe computers available to the users of business graphics?

■ How much support should the information sys-

tems department provide business graphics users? This could include application planning, purchasing assistance, formal training, informal coaching, demonstrations of tools and operational support.

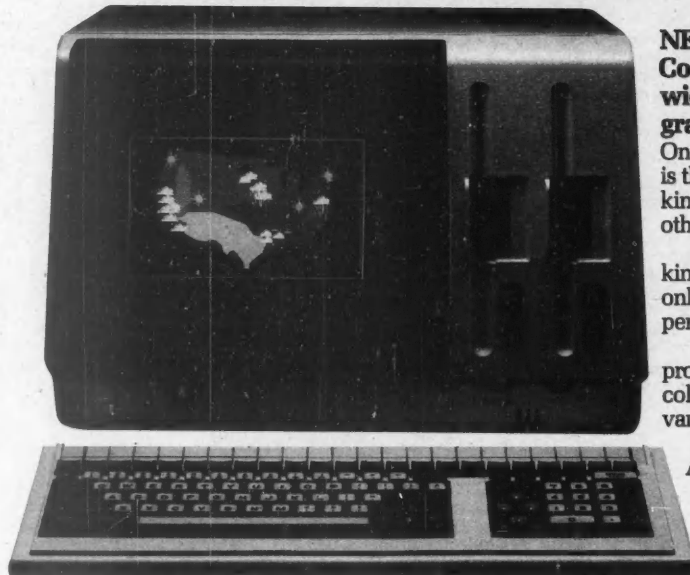
■ How should the information systems department charge for the support it pro-

vides to users?

There are several advantages to business graphics. The key advantage of business graphics is that graphics will get the point across much better than the tabular reports usually used by the information systems department. This is particularly important when the report con-

tains complex data. A second benefit of business graphics is that graphics make it easier to develop a user-friendly interface between the user and the business systems. Finally, computer-generated business graphics are actually easier to read, cheaper, more accurate and faster than graphics done by hand.

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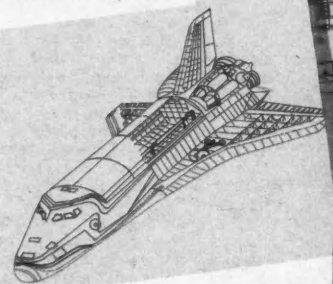
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Jacques is manager of end-user computing in the Consumer Goods Group of General Mills Corp. in Minneapolis.

Computer graphics fertile ground for entrepreneurs

By Jeffrey Graber
Special to CW:

Armed with the twin power of cheap chips and voluminous venture capital, practically anyone with a pair of pliers and a good idea can find a chance to set a trend or carve a new niche in the computer graphics field.

That computer graphics is

a major factor in the computer world is now an indisputable fact. Fueled by reduced memory costs, increased computer power and increased user demand for graphics as an integral computer feature, the computer graphics industry continues to grow at record rates. The graphics market was greater

than \$3 billion in 1983, and it is expected to grow at a hefty 30% to 50% through the 1990s, depending on the application sector.

Yet, while the computer graphics field has become established, the technological and application possibilities are just opening up.

As indicated in the 1984-

85 edition of the "S. Klein Directory of Computer Graphics Suppliers," dozens of new companies have sprung up in the last year alone, offering a wide range of computer graphics products — from workstations to dedicated, very large-scale integration graphics chips, artist paint systems and personal-com-

puter-based, computer-aided design and manufacturing (CAD/CAM) systems. These companies were powered up by an infusion of venture capital and equity that totaled over \$200 million, according to a tally kept by the "S. Klein Newsletter on Computer Graphics."

Over the past two years, for example, workstations have tended to be based on the Motorola, Inc. 68000 microprocessor. Now, the new "chip on the block" in workstation design is the National Semiconductor Corp. 16000 series.

This chip is a 32-bit microprocessor that utilizes the Unix operating system as well as C and Fortran, among other languages. At opposite ends of the country, two start-ups — Mosaic Technologies in Billerica, Mass., and Syte Technology in San Diego — have garnered equal \$5 million venture funding to develop workstations based on the National Semi chip.

Left large firms

The founding entrepreneurs at both companies left important positions at larger companies; the Mosaic team from Perqu Systems, Inc. and Syte people from Megatek Corp. Indeed, the trend of industry leaders departing one computer graphics company to start another is rampant.

Computer graphics entrepreneurship is also based on the sundry graphics standards that are evolving.

The videotex standard, known as the North American Presentation Level Protocol Standard (NAPLPS), too, has given birth to entrepreneurs. In particular, Verticom, Inc. offers graphics terminals whose distinguishing feature is inherent NAPLPS compatibility.

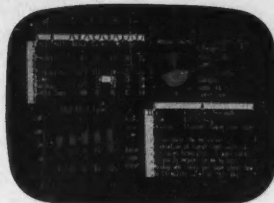
And in CAD/CAM, the Iges standard has spawned General CAD/CAM, Inc., a spin-off company from General Electric Co. whose specialty is to assist users in applying that data interchange standard.

At the opposite end of the scale, the personal computer, exemplified by the IBM Personal Computer and Apple Computer, Inc. products, is only now beginning to spawn new computer graphics companies. These micros have become the CPU for very cost-effective CAD systems.

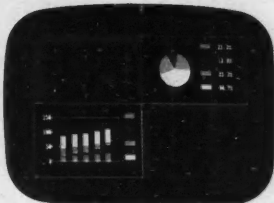
In the fast-paced field of computer graphics, the fleet-footed entrepreneurs continue to lead the way, developing new directions and new products that expand the industry's limits.

Graber is assistant editor of the "S. Klein Newsletter on Computer Graphics," published in Sudbury, Mass.

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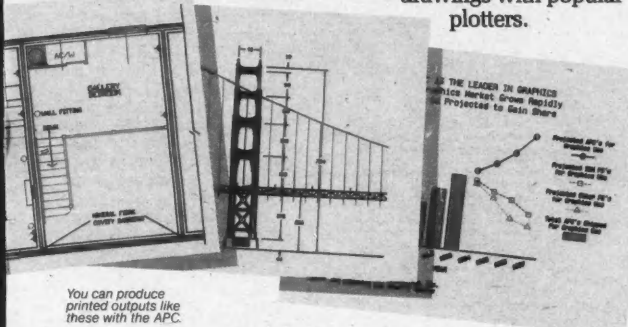
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ABC group turns to graphics for help at budget time

NEW YORK — The screen blips. Introduction music swells. A businesslike personality appears on camera. Smooth delivery. Pleasant, serious demeanor. His voice continues rapid-fire as the screen yields to brilliantly colored charts. Familiar music from a prime-time serial introduces a segment from

that show. The scene fades. A clip from the latest docu-drama? No, a sales presentation heavy with research data. Television techniques are rubbing off on internal management and sales at American Broadcasting Co. here.

It started five years ago,

when Michael Hudak, then a research director for WABC-TV, found a better way to present ratings information to time buyers. He replaced rows of eye-straining tabulations with graphs and charts that interpreted the data. This way, overnight ratings could be packaged

and ready for sales representatives the next day.

But this was only the beginning. He also found a way to record his colorfully displayed graphs on videotape.

Now director of research for ABC-owned and -operated stations, Hudak plans similar packaging of overnight ratings charts for each of the

ABC-owned markets as well as for spot sales.

Chart-Master from Decision Resources, Inc. of Westport, Conn., is the graphics package Hudak uses to introduce his graphs.

Hudak's success in upgrading sales presentations with videotaped computer graphics has not gone unnoticed by colleagues. While internal management areas do not necessarily need the speed with which the graphics software can produce daily updated materials, they do need to enhance corporate communications.

Presentations were never more crucial than they were this year for David Rosen, automated systems coordinator in ABC Corporate Communications. He cites graphics as increasingly indispensable in convincing management to fund resources needed to arrive at complex systems recommendations.

Divisions are always competing for their pieces of the corporate budget pie, but the AT&T divestiture is forcing increases in ABC Corporate Communications' budget at a time when the corporate dictum was for trims. Between 20% to 25% budget increases may result from the divestiture, Rosen said, which is consistent with industry-wide projections.

Corporate Communications at ABC has to cover a vastly increased data load due to the divestiture. Competitive bids will have to be sought and extensive data analyzed. Outside contractors have to be hired, Rosen said. "We will have to search for competitive systems in a lot of areas where we didn't before," Rosen said. "So one of the biggest things we have to sell management is our professionalism," he added. "Presenting data graphically is a step in the right direction." He does it using Chart-Master software on an IBM Personal Computer and a Hewlett-Packard Co. 7470A two-pen plotter.

"Some data is too detailed for a good presentation," Rosen said. "Graphics show the trend, the scope of a project in better detail. Management likes to see that." They also like to see numerical definition of trends, Rosen said, so he inserts figures on chart components.

He credited the graphics package as a boon in getting through the budget process. "Charts paved the way in explaining our costs," he said.

Just how cost-effective are the graphs? "You get more information to management in less time," Rosen said. And, he continued, visually oriented presentations generate fewer requests for supportive data.

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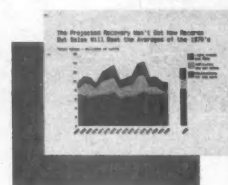
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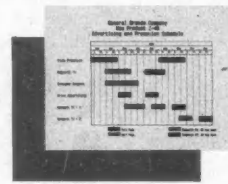
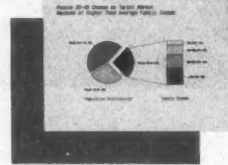
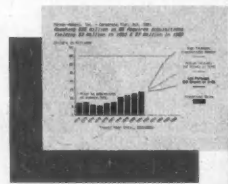
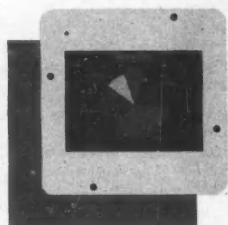
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single bar omission
unequal line lengths
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4 line marker types
8 line types
5 frame options



8 fill patterns
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log scaling
scaling scaling
multiple curve fits
floating comments
More space for your message
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150 character footnote
150 character comment
50 character axis titles
40 character legends
20 character bar/slice labels
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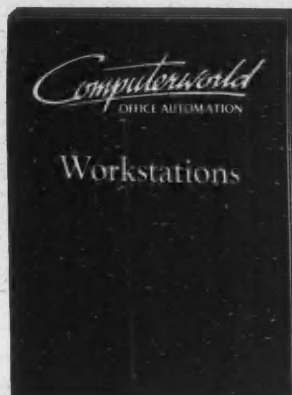
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August

In this issue we'll look at microcomputer and word-processing software, using product reviews and case histories. Plus, we'll show readers how to decide which products meet their current and future needs.

Closes: July 6



October

Readers will get the latest on integrated workstations and word processors. We'll make product comparisons, evaluate systems, and examine equipment capabilities. And we'll discuss hardware compatibility, hardware upgrades, and cost-justification ideas.

Closes: August 31



December

Coverage includes: user interfaces, natural languages, data bases, decision support systems, information centers, and artificial intelligence. Also, we'll highlight user solutions and vendor trends as we consider the current and future benefits of systems software.

Closes: October 26

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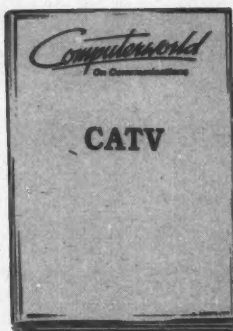
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August

We'll look at full motion video, freeze frame, electronic blackboards, and computer conferencing. Plus we'll examine the cost-effectiveness of these technologies, and provide information on private and public facilities.

Closes June 29



September

We'll study how business communication carriers and users can put voice, data, and other traffic on the thousands of miles of existing CATV cables. CATV loops are a viable alternative to those offered by the Bell Operating Companies.

Closes August 3



October

Communications networks are switching to all-digital. AT&T and MCI are using fiber-optic-based transmissions and satellite services. We'll explore how these changes affect users, and what the opportunities are for vendors.

Closes August 31

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COMMUNICATIONS



GTE launches hybrid satellite

Coincidentally, and justly fitting, a satellite of an older generation was retired earlier this month days after a bird of another generation took to wing.

RCA American Communications, Inc. used the last of Satcom I's on-board fuel supply to nudge the satellite out of geosynchronous orbit. This will slow the craft down, elongate its orbit above the equator and slowly take it deeper into space.

Satcom I was the first domestic communications satellite to carry 24 transponders, twice that of its predecessors. A transponder can be used to carry any type of communications — including multiple high-speed data channels — but in its heyday, Satcom I was used to usher in the CATV industry.

Using a single transponder, a Satcom I user like Home Box Office could simultaneously distribute a full-motion video signal and accompanying sound to multiple locations.

In its new orbit, Satcom I will be safely out of the way of other communications satellites serving North America, which hang in the heavens 23,000 miles above the equator. At this altitude, the crafts obtain a geosynchronous orbit — synchronized with geo, the Greek root for earth — and appear stationary from the ground, making them available for constant use.

When Satcom I was launched in 1975, it weighed 1,915 pounds, 400 pounds more than its predecessors. Spacenet I, the first-of-its-kind satellite launched in May by GTE Spacenet, a division of GTE, weighed 2,634 pounds at launch. In orbit, its solar panel wingspan will be 47 feet.

While having the same number of transponders as Satcom I, Spacenet I is the first domestic communications satellite to carry transponders that operate at different frequencies. The bird has both C-band transponders, which operate at 4 and 6 GHz, and Ku-band transponders, which operate at 12 and 14 GHz.

C-band has typically been used in the

See GTE page 66

Xerox adds IBM micro support

Offers terminal emulation, remote batch software

By John Dix
CW Staff

PALO ALTO, Calif. — Xerox Corp. recently announced communications products that provide for the direct support of IBM Personal Computers on Ethernet and software that enables a Xerox Star workstation to emulate two widely used terminals.

A remote batch product was also announced to provide multivendor document interchange.

The company reported that 3Com Corp. of Mountain View, Calif., would provide hardware to connect IBM Personal Computers directly to Ethernet. Together with 3Com, Xerox is developing software to enable users to create documents on a Personal Computer and then access Ethernet network services for electronic printing, filing, electronic mail and mainframe access.

With the new software, users of Xerox 8010 Star workstations can emulate IBM 3278 display terminals and Digital Equipment Corp. VT100s. The Star's windowing capability enables a user to access simultaneously up to six programs on as many Ethernet-based hosts.

Sessions supported are not dependent on the type of hosts and protocols used. "An asynchronous or [teletypewriter] emulation session can be supported in one

window using typical asynchronous virtual terminal circuit protocols, while [Systems Network Architecture] is happening in another session using an [IBM] 3270 data stream," explained Larry Garlick, manager of communications services in Xerox's Office Systems Division.

Data from a window representing one ongoing session can be captured and copied into another window, even if one session is supported by a DEC system and the other by an IBM computer, a company spokesman said.

According to Garlick, unlike the IBM 3270 Personal Computer, the Star is not tied to a particular server. The 3270-PC is dependent on a cluster controller that enables it to access up to four sessions, all in the same place, he said. With an Ethernet-based Star, the Xerox workstation can access up to six independent servers.

The newly announced remote batch service, according to the company, is designed to provide for document interchange in a multivendor environment.

The service uses IBM 2770/2780/3780 protocols and can be used to transfer information on an IBM mainframe to a Xerox network system for enhancement, a spokesman said. Additionally, information created on a Xerox system can be sent to a mainframe for processing or archiving.

See XEROX page 66

Bypass technology seen on the rise

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Opinions differ on whether bypass is a clear and present danger to local telephone companies, but some analysts are predicting bypass will increase substantially in the next few years.

Jerry Lucas, president of Telestrategies, Inc., a McLean, Va., consulting firm that specializes in tracking bypass developments, discussed the subject at a conference held here earlier this month by his firm.

About 40% of the revenue earned by U.S. communications carriers from long-distance services is paid by users located within the central business districts of the nation's 100 largest cities, Lucas explained, adding that bypass systems are now operating, under construction or planned in most of these cities.

Lucas cited Dallas as an illustration of

what is, or shortly will be, happening elsewhere:

Within a one-square-mile area of downtown Dallas are 79 buildings whose occupants pay \$107 million/year in long-distance communications charges. By the end of 1984, this area will be served by a CATV network, four "teleports" (satellite earth stations) and three digital termination systems. Lucas' point was that the concentration of traffic will make it easier for these new carriers to bypass the local telephone network.

Ten of the buildings already have announced plans to offer their tenants bypass facilities by the end of this year, Lucas reported. These "intelligent buildings" are particularly significant, he said, because they provide a way of consolidating traffic generated by many smaller volume users into a total large enough to make bypass facilities economically feasible.

See LUCAS page 66

AT&T unveils Commkit line for Unix System V users

NEW YORK — AT&T Technologies has announced its Commkit line of communications and networking software, which is designed for Bell Laboratories' Unix System V users.

Commkit Software-Synchronous Terminal Interface permits a variety of Ascii and Ebcidic-compatible terminals and printers to communicate with AT&T Technologies 3B computers and other minicomputers running under Unix System V, according to a spokesman from AT&T Technologies.

Commkit Software-Ethernet Interface

is said to support the Ethernet local-area network in Digital Equipment Corp. VAX-11 computers running under Unix System V.

It provides batch file transfer and remote command execution and permits communication between other Ethernet-compatible machines in a multivendor environment, the AT&T Technologies spokesman said.

Commkit Software-Hyperchannel Interface connects AT&T 3B20 computers or other minicomputers running Unix System V and the Network Systems Corp. Hyper-

channel high-speed, local-area network, according to AT&T.

The package is said to provide peripherals sharing, centralized administration, file transfer and remote execution.

All three packages will be available in source code during the third quarter of 1984.

The synchronous terminal interface and Ethernet interface are priced at \$5,000 each, and the Hyperchannel interface is priced at \$10,000.

AT&T Technologies is located at 222 Broadway, New York, N.Y. 10038.

INSIDE

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Voice/Data Communications/62

Software/62

Multiplexers/64

Modems/64

Network Services/64

Test Equipment/64

Auxiliary

Equipment/64

COMMUNICATIONS

CONTROLLERS

TELERAM COMMUNICATIONS CORP.

Starlink

Teleram Communications Corp. recently announced a shared storage device for use with its line of terminals, including its 3100 portable terminals, that can also be used to transfer formatted data to other locations.

Starlink is available with 17M to 320M bytes of Winchester disk storage and allows connection of up to 24 on-site terminals and access by an unlimited number of remote terminals, according to the vendor.

Using Teleram's Data Storage System software and Zilog, Inc.'s storage devices, Starlink reportedly allows users to create common files, add to

existing files, use portions of files and transmit messages. Starlink is designed to recognize terminal priority and limit file access where desired, the vendor said.

Available in eight-port, 16-port and 24-port units, Starlink is scheduled for delivery in July. A basic configuration of four terminals, 17M bytes of disk capacity and eight ports is priced from \$30,000 to \$35,000, depending on the model terminal selected.

Teleram, 2 Corporate Park Drive, White Plains, N.Y. 10604.

NCR COMTEN, INC.
SS1 R5; EP4 R5 enhancements

NCR Comten, Inc. has announced enhancements for its data communications software: Comten Start-Stop 1 Release 5 (SS1 R5) and Comten Em-

ulation Processing Release 5 (EP4 R5).

SS1 R5 is said now to support high-speed asynchronous lines that link color graphics terminals and personal computers to data centers through the Comten Asynchronous Modem Interface Module and through the Comten Data Link Control Modem Interface Module.

When used with other Comten EP4 programs, SS1 R5 reportedly provides for switched and dedicated line connection, application switching, automatic dialing, global and application-dependent message processing and statistics gathering.

The Comten EP4 R5 is said to give users increased data throughput. It reportedly performs data-handling tasks between bisynchronous and asynchronous terminals and one or more IBM host computers.

Both software products reside in a Comten 3600 communications processor, which can support up to eight host computers and a variety of communications devices. They will be available during the fourth quarter.

Comten EP4 R5 is a no-charge licensed software product. The license fee for the Comten SS1 R5 is \$81/mo or \$891/year.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

VOICE/DATA
COMMUNICATIONSCABLESHARE, INC.
Tesy-1; Tesys-5

Cableshare, Inc. has announced packet switches to enhance its line of X.25 communications interfaces.

Designed for use in public or private packet-switched networks, the Tesys-1 and Tesys-5 switches are said to implement X.25, X.75, X.3, X.29 and X.121 protocols. They also reportedly support IBM environments by providing Systems Network Architecture/Synchronous Data Link Control support for IBM 3270 and IBM 3780-type devices.

The network nodes and concentrators are said to feature a modular design consisting of 34 packet-switching blocks with each block using an Intel Corp. 80286 processor.

A Tesys-5 node allows connection of up to 1,496 synchronous or asynchronous devices operating at speeds up to 64K bit/sec, while the Tesys-1 can support up to 44 devices, according to the company. Prices start at \$40,000.

Cableshare, P.O. Box 5880, 20 Enterprise Drive, London, Ont., Canada N6A 4L6.

UNITED TECHNOLOGIES COM
DEV
8200 series additions

United Technologies Com Dev has announced two mid-range models for its 8200 Call Accounting Series Telecommunications Processor family.

The TP8234 serves 250 stations and stores up to 10,000 call records, while the TP8235 serves 250 stations and stores up to 20,000 call records, according to the company. The TP8234 reportedly can be used outside of the U.S. with the addition of Com Dev's Universal Rating Module I software option.

Both models can be equipped with a line scanner option and run either the Com Dev Callquest II or Com Dev Hotel/Motel applications package. Available now, the TP8234 costs \$4,900, and the TP8235 costs \$5,950.

United Technologies Com Dev, 2006 Whitfield Industrial Way, Sarasota, Fla. 33580.

SOFTWARE

RHINTEK, INC.
EMU

Rhintek, Inc. has announced an emulator designed to let the IBM Personal Computer and its compatibles emulate the Data General Corp. D2000 terminal.

The EMU software is said to support speeds of up to 19.2K bit/sec and to be implemented in machine lan

Continued on page 64

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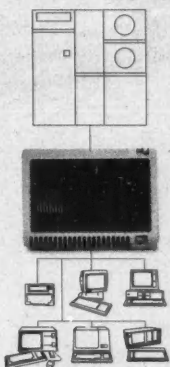
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COMMUNICATIONS

RHINT from page 62

guage. It reportedly bypasses the IBM DOS and Bios functions to display quickly and transfer a file to disk.

Designed for direct connection, it is said to allow remote communications and to feature automatic dial support for autodial modems, single-key redial and single-key logon.

The software is distributed on a non-copy-protected diskette that allows installation on a fixed disk.

The binary license for use on one machine is \$115. Multi-user licenses, source licenses and customized versions also are available.

Rhintek, P.O. Box 220, Columbia, Md. 21045.

MULTIPLEXERS/ MODEMS**WOLFDATA, INC.**
WD-212-X

Wolfdata, Inc. has announced a synchronous/asynchronous 1,200 bit/sec modem featuring AT&T 212A and 103 protocols and also the CCITT X.25 link-access procedure (balanced) error-correction protocol.

The WD-212-X modem was designed to connect IBM's and others' personal computers and data terminals to packet networks, mainframes and other personal computers, according to the vendor.

The modem's multiple-microprocessor design is said to enable it to adjust automatically to telephone line operating conditions.

It also includes direct connect, autodial/autoanswer features that allow computer-to-computer and remote data access and local-area network communications, the vendor said.

The WD-212-X is available as a stand-alone modem or as a printed-circuit board for use in the IBM Personal Computer, according to a Wolfdata spokesman.

Prices start in the range of \$345 in OEM quantities.

Wolfdata, 187 Billerica Road, Chelmsford, Mass. 01824.

NETWORK SERVICES**RCA CYLIX COMMUNICATIONS NETWORK, INC.**
Dial Backup

RCA Cylix Communications Network, Inc. has announced its Dial Backup system for users of its satellite-based, value-added data communications network.

It is said to allow users to set up temporary landline links between their host com-

puters and remote terminals when their dedicated circuit service is interrupted.

According to the company, dial backup equipment at the customer site consists of a dial backup unit, a multiple-line telephone and cables connecting the equipment to an RCA Cylix modem.

Two dedicated, switched telephone lines and a dedicated ac duplex outlet also are required at each user site, according to the vendor.

The dial backup line trans-

mission speed is 4,800 bit/sec, according to RCA Cylix.

Charges are a one-time installation fee of \$325 per host and \$250 per remote terminal, a monthly access charge of \$200 per host and \$60 per remote terminal and a monthly surcharge of \$15 per million characters in prime time and \$7.50 per million characters in non-prime time.

RCA Cylix, 800 Ridge Lake Blvd., Memphis, Tenn. 38119.

TEST EQUIPMENT**DIGILOG, INC.**
Model 200; Model 400

Digilog, Inc. has announced two protocol analyzers that are said to set up automatically, decode and analyze protocols and test and identify faults.

The Model 200 and Model 400 both feature remote control and comprehensive bit-error rate test.

They cost \$4,995 and \$7,495, respectively.

Digilog, 1370 Welsh Road, Montgomeryville, Pa. 18936.

AUXILIARY EQUIPMENT**DIGITAL PATHWAYS, INC.**
Defender II/Model 8

Digital Pathways, Inc. has announced an eight-line,

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COMMUNICATIONS

dial-in computer security system designed for use in small organizations.

Defender II/Model 8 is said to be the lowest cost member of the Defender II family of security products. It was designed for use as a stand-alone unit protecting up to eight outgoing telephone lines or as a slave unit in a larger dial-in network. The system requires a caller identification number and a Defender-generated callback before access is allowed.

Scheduled for shipments in late July, Defender II/Model 8 is priced at \$3,600, the vendor said.

Digital Pathways, 1060 E. Meadow Circle, Palo Alto, Calif. 94303.

FIBRONICS INTERNATIONAL, INC. Model FM 1601

Fibronics International, Inc. has announced a fiber-optic data link modem designed to extend the working

distance between a computer controller and its terminals and printers.

The Fibronics Model FM 1601 is said to interface with any coaxial or twinaxial cable-connected device and its controller. It reportedly allows IBM System/34 through System/38 or IBM 5520 user to string remote terminals up to one mile with fiber-optic cable.

It also reportedly allows use of an IBM 5250 computer-aided design and comput-

er-aided manufacturing systems and IBM 3270-type devices.

With the addition of a Fibronics Coaxial Doubler, the 1601 is said to become a two-port fiber-optic multiplexer for the IBM 3274 controller, System/34 through System/38 and the ITT Courier Systems, Inc.'s 7411.

Prices for the Model FM 1601 start at \$1,100.

Fibronics International, 325 Stevens St., Hyannis, Mass. 02601.

EMC CORP. EMC 5258

EMC Corp. has announced an enhanced communications interface for Prime Computer, Inc. systems that is said to enable up to 32 asynchronous channels to be supported from a single card slot.

The EMC 5258 reportedly doubles the capacity of Prime's asynchronous multiline controller and queuing asynchronous multiline controller (QAMLC) terminal interfaces, while requiring less power than a single QAMLC card. It is designed to operate under Prime's high-speed direct-memory queue and direct-memory transfer modes.

According to the vendor, the EMC 5258 lets the Prime user add communications capability without having to add a new card cage and power supply and can be used to free additional chassis slots for other I/O uses.

It features 16 standard speeds up to 19,200 bit/sec for any channel and an option to program transmission rates for special applications. It is said to include an on-board microprocessor and an EMC-designed connector panel using RS-232C connectors.

The 32-channel 5258 costs \$6,500, while a 16-channel version costs \$4,200.

EMC, 12 Mercer Road, Natick, Mass. 01760.

TELEBYTE TECHNOLOGY, INC. Model 63-3H; 63-4H

The Remark Datacom Division of Telebyte Technology, Inc. has announced two RS-232 to RS-422 conversion devices.

Models 63-3H and 63-4H are said to be configured individually to operate as data terminal or data communications equipment, providing the link needed to couple RS-422 to RS-232 units.

Now available, the converters are \$98 each, or \$78 in quantities of 100.

Telebyte Technology, 148 New York Ave., Halesite, N.Y. 11743.

UNITED TECHNOLOGIES COM DEV Dispatcher

United Technology Com Dev has announced Dispatcher, a device that dials a pre-programmed telephone number and delivers a text message.

Dispatcher reportedly can be used with telecommunications equipment, computers, energy management systems or other equipment that has either an alarm contact or an RS-232C maintenance interface.

Scheduled for delivery in late July, it costs about \$600 in OEM quantities.

United Technologies Com Dev, 2006 Whitfield Industrial Way, Sarasota, Fla. 33590.



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COMMUNICATIONS

XEROX from page 61

Documents can be exchanged with other mainframes, word processors and workstations that support the IBM protocols and formats, the company reported.

The IBM Personal Computer operating on Ethernet will be demonstrated at the National Computer Conference in Las Vegas in July. The 3Com board and software for the Personal Computer cost \$795. Product orders will be

taken beginning in September. Customer installations are slated to begin in November.

The terminal emulation and remote batch service software will be available in October. Prices for these incremental software features range from \$200 to \$1,500, the company said.

Information is available from Xerox's Office Systems Division, which is located at 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

LUCAS from page 61

According to Lucas, a year ago only two intelligent building projects were announced in Dallas; today a total of 16 are under way. This is taken as an indication of how fast bypass is spreading. Lucas expects that by the end of 1985, a total of 287 intelligent buildings will be in place or under construction throughout the U.S. By comparison, at the end of April 1984, only 72 were being

built, Lucas said.

The major push behind bypass is economic, Lucas said. If a user accesses AT&T's long-distance network through his local telephone company's dial-up facilities, he now pays a carrier common-line charge averaging 8.4 cent/min.

As a result, business users and long-distance carriers are now looking eagerly for "last-mile" connections that cost less than 8.4 cent/min.

The most innovative alter-

native, Lucas said, is MCI Communications Corp.'s Cablephone service. It enables a user equipped with a Touch-Tone telephone to communicate via CATV with the local terminus of MCI's long-distance network. The cost of each subscriber connection is \$10/mo, Lucas said. For residential users, whose long-distance calls average 110 min/mo, Cablephone presently offers little saving. But for business customers, whose average usage is considerably higher, there's a real benefit. For a company whose usage totals 890 min/mo, for example, the Cablephone cost is less than 2 cent/min.

The present Cablephone system multiplexes a 6 MHz television channel into 240 analog voice circuits, Lucas reported. Through use of demand-assignment techniques, up to 2,400 users can be served on each channel.

MCI is now leasing Cablephone facilities from five CATV networks and is paying them about \$700,000/mo, according to Lucas. While the service can be offered only in cities that have two-way cable systems, he pointed out that all systems built since 1981 have this capability.

GTE from page 61

telephone and broadcasting industries. Unfortunately, the frequencies in this range are also typically used for terrestrial microwave communications. This has served to make it nearly impossible to beam a satellite signal into a metropolitan area where microwave traffic is particularly congested.

This fact contributed to the development of Ku-band technology. Satellite Business Systems (SBS) was the first domestic carrier to launch satellites using these frequencies. Consequently, SBS became the first carrier to offer communications services directly into microwave-congested cities.

GTE Spacenet's hybrid satellite will enable the company to support existing networks that use the lower frequency C-band, as well as new systems operating at the higher frequencies, the company reported.

Two other Spacenet satellites are scheduled for launch later this year and in early 1985. The price tag for the whole system, including construction of a spare bird, is said to exceed \$300 million.

GTE acquired Spacenet when it bought the Southern Pacific Communications Corp. from Southern Pacific Railroad. The primary reason for the acquisition was to purchase Sprint, the long-distance discount telephone network that was held by that company. GTE Satellite, another GTE division, also plans to launch two Ku-band satellites during 1984-85.

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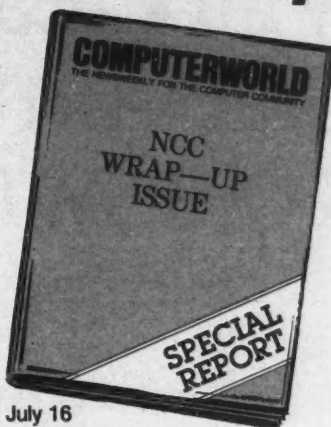
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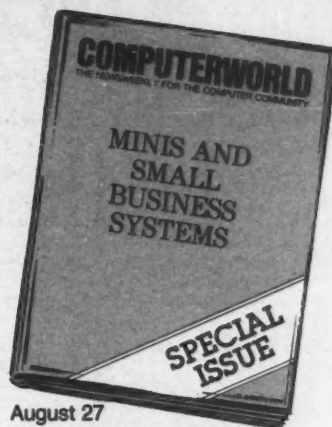
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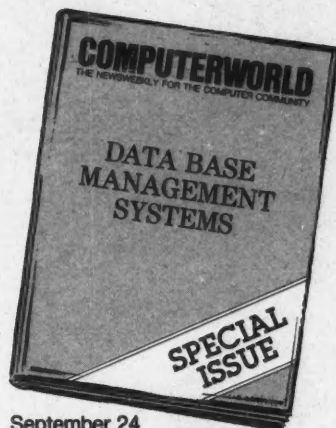
July 16

NCC Wrap-up Issue
Part 2 of *Data Pro's* hardware survey. Also, we'll recap the major product announcements and happenings at the show.
Closes June 29



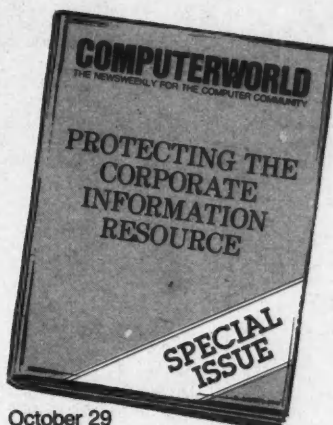
August 27

Minis and small business systems
We'll take a close look at the growing number of applications available. Plus we'll include reports from users on the problems they've had in selecting and implementing these systems, and how they solved. Also, we'll offer vendors' suggestions on how to increase the efficiency and cost-effectiveness of minis and small business systems.
Closes August 10



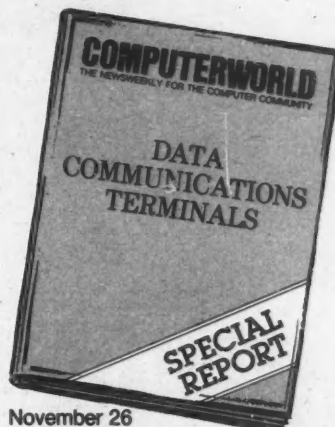
September 24

Data Base Management Systems
A comprehensive report geared toward a realistic understanding of DBMS. We'll include articles from users and industry experts on how to evaluate, select, implement, and trouble-shoot DBMS. And we'll update recent developments, as well as offer users' solutions to common and not-so-common DBMS problems.
Closes September 7



October 29

Protecting the Corporate Information Resource
We'll discuss how to protect hardware & software resources, people resources, and physical plants. There'll be articles on: uninterruptible power supplies, data security monitors, data encryption software, disaster recovery centers (offsite data storage), fault-tolerant processing, data transmission security, protecting the computer room, and contingency planning.
Closes October 12



November 26

Data Communications Terminals
Users and vendors will comment on how terminals are making computers more responsive to organizational needs. Topics include: how to get the most out of dumb terminals; an update on smart and intelligent terminals; and guidelines for determining terminal needs and selecting the equipment to meet them.
Closes November 9

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SYSTEMS & PERIPHERALS

Study says laser printers lead the pack in printer revolution

By Edward Warner
CW Staff

FRAMINGHAM, Mass. — The boom has yet to come for nonimpact printers, though steady growth is expected through 1987. Leading that boom will be laser-based page printers, according to a recent market research report.

International Data Corp. (IDC), based here, stated that while nonimpact printer technology has been around for some time, sales of nonimpact printers have "grown in fits."

The report predicted that the installed base of nonimpact printers will continue to double every two years, reaching 800,000 units by 1985 and 1.6 million units by 1987. The majority of those installations will involve serial printers, by roughly a three-to-one ratio, the report noted.

The report predicted total U.S. nonimpact printer shipments in 1984-85 to reach 421,300, more than double the 198,500 total from 1982-83. Growth predicted for 1984-85 in serial printers was pegged at 315,000 units shipped, roughly double the 1982-83 figure. Line and page printers were predicted to show tripled growth in 1984-85, with shipments of 68,300 and

38,000 units, respectively.

Most serial printer sales will be low-end machines (1 to 160 char./sec), while line printer sales will be strongest in the medium range (300 to 1,199 line/min.) and page printers will be strongest at the low-end (up to 20 page/min.)

A separate IDC memorandum on the page printer market pointed out that while "low-end page printers are just barely hitting the market, test models of low-speed page printers have been around for a couple of years now, and most reports are good."

The page printer memo predicted that technological developments could make 1985 "the year of the laser [page] printer," especially if a model in the \$3,000 price range is developed. "Then, the laser printer would likely become the printer of choice for professional users overnight — provided the need or desire for color graphics does not suppress demand," the report said.

The memo blamed lagging sales of page printers on customer supposition that the machines were trouble-prone, costly and "perhaps above all, just a bit too early for

See PRINTER page 73

Wang announces entry-level CPU for VS family

LOWELL, Mass. — Wang Laboratories, Inc. has announced the VS 15, an entry-level addition to its family of VS processors.

The VS 15 provides up to 1M byte of main memory. The unit supports up to 10 users and includes remote diagnostics features. The VS 15's cabinet can hold one or two 33M-byte disk drives or a single 76M-byte disk drive, the vendor said.

Eight preconfigured packages are available; however, users can purchase individual system components. A basic system priced at \$13,500 consists of a CPU with 256K bytes of main memory, the operating system and a remote diagnostics facility; one internal 5.25-in., 33M-byte fixed disk drive; and a 5.25-in., 360K-byte diskette drive, the vendor said.

A spokesman said the VS 15 supports 16 I/O ports for workstations and peripherals. Four I/O ports are available for telecommunications.

As users add up to 10 workstations to their system, they can expand memory from 256K bytes to 512K bytes or 1M byte of main memory. Corresponding disk configurations are available, as is an optional cartridge tape drive or industry-standard, nine-track tape drive for backup.

With Wang Systems Networking transports, the VS 15 can tie into other remote Wang systems, including other VS series systems, Wang Office Information Systems, Alliance systems and Professional Computers, over dedicated or leased telephone lines. No special air conditioning or power lines are required for installation, the firm said.

The VS 15 can communicate with a host mainframe through a number of protocols. It supports IBM's 3271 Binary Synchronous Communications (BSC) and 3274 Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) information display systems emulation, 2780/3780 BSC for batch mode, 3777 SNA/SDLC for batch access to SNA networks, VS Hasp emulation and a teletypewriter mode for interactive asynchronous communication.

See WANG page 73

■ Optical Storage International, a joint venture by Control Data Corp and N.V. Philips, has announced an optical disk drive/70

■ Racal-Redac, Inc. unveiled a VAX-based system aimed at electronic engineering applications/70

INSIDE

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Graphics Systems/72

Board-Level Devices/72

Auxiliary Equipment/73

PERCENT OF TOTAL U.S. NONIMPACT PRINTER INSTALLED BASE COMPOSITION
BY PRINTER TYPE, 1981-1987

| | | | 1981 | 1983 | 1985 | 1987 |
|------------------------------|-----------------|------------------|--------|--------|--------|--------|
| SERIAL: | Low-end | 1-160 cps | 77.9% | 71.2% | 63.6% | 56.4% |
| | Medium | 161-320 cps | 5.1 | 7.1 | 7.9 | 9.4 |
| | High-end | 321 cps & up | 2.5 | 4.8 | 7.1 | 9.4 |
| | TOTAL — SERIAL | | 85.4% | 83.2% | 78.6% | 75.8% |
| LINE: | Low-end | Up to 299 lpm | 0.6% | 1.4% | 3.2% | 3.6% |
| | Medium | 300-1199 lpm | 9.5 | 8.5 | 8.4 | 6.7 |
| | High-end | 1200 lpm & up | 1.3 | 2.0 | 2.6 | 2.4 |
| | TOTAL — LINE | | 11.4% | 12.0% | 14.3% | 12.7% |
| PAGE: | Low-end | Up to 20 ppm | 0.0% | 0.3% | 3.2% | 7.6% |
| | Medium | 21 ppm to 60 ppm | 1.3 | 2.8 | 2.6 | 3.0 |
| | High-end | 61 ppm & up | 1.9 | 1.7 | 1.3 | 0.9 |
| | SUBTOTAL — PAGE | | 3.2% | 4.8% | 7.1% | 11.5% |
| TOTAL PRINTER INSTALLED BASE | | | 100.0% | 100.0% | 100.0% | 100.0% |

*Percentages shown may not add exactly due to rounding.

IDC CHART

Trilogy's dream mainframe shattered by problems, high expenses



HARD TALK
Tom Henkel
CW Senior Editor

After months of technical problems and financial disappointments, Gene Amdahl's Trilogy, Ltd. has bowed out of the mainframe processor business. Instead, the company hopes to perfect, and sell, its wafer-scale integrated circuit packaging technique.

Saying Trilogy bowed out of the mainframe business is probably being too kind. The company never really made it into the business. There were promises of 1985 shipments of a 32 million instructions per second (Mips), IBM-compatible,

fault-tolerant mainframe that would cost less than IBM mainframes offering half the performance. But multiple delays and technical problems turned that dream processor into a mirage.

The failure of Trilogy's mainframe project is not just a story of a startup company that fell short of its dreams. It is a testament to the dramatic changes that have taken place in the mainframe marketplace in the past 10 years.

When you think about it, a new technology, IBM-compatible mainframe from a startup company sounds too good to be true. But the legendary Gene Amdahl was making the promises, and that seemed to give the whole idea an air of credibility. After all, Gene Amdahl, while at the helm of Amdahl Corp., was

able to give IBM a serious run for its money in the 370-compatible arena.

Back in 1970, Gene Amdahl started Amdahl Corp. with roughly \$50 million. In 1981, when he formed Trilogy, Amdahl started off with \$85 million in venture capital and managed to raise another \$55 million through sales of limited partnerships. Another \$77 million was raised by selling stock and license agreements to CII Honeywell Bull of France, Sperry Corp. and Digital Equipment Corp. But industry watchers contend that was not nearly enough. Some said Trilogy needed another \$100 million to \$200 million to get the mainframe project off the ground.

The costs involved in building and selling a high-powered mainframe are phenomenal. The R&D

costs alone can make your head spin. But that is only the beginning. To compete with big names like IBM, the established plug-compatibles and the so-called pack of mainframe companies, a startup mainframe vendor has to establish a national sales force and maintenance network. It also must be able to advertise and keep pace on the trade show circuit with the big guys — two very costly endeavors.

Delivery delays caused by technical problems also forced Trilogy out of the mainframe business. When Gene Amdahl started talking about his new mainframe, he was comparing it to IBM's 3081. Now, the 3081 has been nearly forgotten in the flood of rumors about IBM's next big mainframe, the "Sierra," expected

See AMDAHL page 73

SYSTEMS & PERIPHERALS

Laserdrive 1200 debuts

SANTA CLARA, Calif. — Optical Storage International, a joint venture between Control Data Corp. and Netherlands-based N.V. Philips, has unveiled its first optical disk drive, the Laserdrive 1200.

Designed for use mainly with medium-size systems, the drive will be available in the first quarter of 1985. Initially, the unit will be marketed only to OEMs, a CDC spokesman said.

The unit features a nonerasable storage capacity of 1G byte, a 150 msec access time and a sustained data transfer rate of 250K byte/sec, according to the CDC spokesman.

The drive comes in a cabinet which is 5¼ in. high, 19-in. wide and 25.6 in. deep. Information is recorded

on a 12-in. glass disk. CDC said both the drive and recording disk have been under development for several years at laboratories in Colorado and the Netherlands.

Principal applications of the drive include on- or off-line access to large data bases of permanent information, such as those used in banking, insurance, petroleum, government and mining applications.

The Laserdrive 1200 costs \$6,600 in quantities of roughly 200. The recording disks are priced at \$265 each in OEM quantities.

More information is available from Optical Storage International at P.O. Box 58063, 3333 Scott Blvd., Santa Clara, Calif. 95052.

CIEE unveiled for engineers

WESTFORD, Mass. — Racal-Redac, Inc. has announced the Computer Integrated Electronic Engineering (CIEE) system for spanning and integrating a range of electronic engineering applications from engineering through design to production and testing.

The CIEE system is said to enable an engineer to create circuitry on a workstation and then simulate its performance before design commitment. The system is configured on a family of standard hardware. Digital Equipment Corp.'s VAX series 32-bit superminicomputers are used in conjunction with Racal-Redac's V-Series workstations for printed circuit-board design.

Racal-Redac's A-Series workstations are based on Apollo Computer, Inc.'s systems for engineering and silicon-design graphics applications. IBM Personal Computers provide data capture and engineering capabilities to complement the other workstations.

CIEE's relational data base enables data transfer between all workstations and software packages. The data base is also said to allow data transfer to existing office automation systems and other computer-aided design systems.

The price for the Series A workstation, including the circuit design package, is approximately \$60,000, the vendor said. The product will be available in October. The price for the IBM Personal Computer circuit design and data capture software is \$12,000 per package, the vendor said. The product will be available in September.

Racal-Redac is located at Lyberty Way, Westford, Mass. 01886.

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PROCESSORS

DATAcube, INC. SP-123 Signal Processor

Datacube, Inc. has announced the SP-123 Signal Processor for its Digital Equipment Corp. A-bus and Intel Corp. Multibus high-resolution image acquisition board family.

The SP-123 is said to operate in conjunction with Datacube's VG-123 (Multibus) and QVG-123 (Q-bus) digital video frame stores to provide real-time image processing.

Image temporal and spatial filtering, image subtraction and other arithmetic functions reportedly are performed at 14.3 million pixel/sec.

One bit plane can be used to switch between two different processing algorithms, the vendor said.

The SP-123 is priced at \$3,995.

Datacube, 4 Dearborn Road, Peabody, Mass. 01960.

DATA STORAGE

PYRAMID TECHNOLOGY CORP. Disk drive; magnetic tape

Pyramid Technology Corp. has announced two products for its 90X superminicomputer, a 300M-byte removable disk drive and a tridensity magnetic tape.

The 90X supermini is a 32-bit, virtual memory processor that uses the firm's OSX operating system. Features include a dual-port version of two major implementations of the Unix operating system: System V from Bell Laboratories and the 4.2 BSD from the University of California at Berkeley.

The 300M-byte removable disk drive, Model 6100, is supplied in a free-standing, top-loading cabinet specifically designed for users who require removable data pack storage.

The tridensity magnetic tape, Model 6210, is available along with Pyramid's 1,600 bit/in. streaming tape. The 6210 tape is a 45 in./sec. start/stop drive with 6,250 bit/in. capability as one of three operator-selectable data densities.

SYSTEMS & PERIPHERALS

The 6210 is said to reduce to three the number of reels required to back up a 415M-byte disk.

The 300M-byte disk drive is priced at \$35,000 (drive only), and the tridensity tape is priced at \$31,500 (drive and cabinet), according to the vendor.

Pyramid Technology, 1295 Charleston Road, Mountain View, Calif. 94043.

DYLON DATA CORP. Series 10 Magnetic Tape System

Dylon Data Corp. has announced the Series 10 Magnetic Tape System for users of the Hewlett-Packard Co. HP 1000 minicomputer. The tape system can be used on Models M, E or F of the HP 1000 and is said to increase overall system throughput, according to the vendor.

The Series 10 features dual-density 800/1,600 char./in. or tridensity 800/1,600 char./in. at 75 in./sec and 6,250 char./in. at 45 in./sec, the vendor said. It requires one slot in the processor chassis and is plug-compatible with the HP operating system and DVR23 drive, according to the vendor.

The Series 10 is priced at \$17,390 for dual-density and \$19,995 for tridensity group-code recording, the vendor said. The product is scheduled to be available Aug. 1.

Dylon Data, 9561 Ridgehaven Court, San Diego, Calif. 92123.

PRINTERS/ PLOTTERS

DATA GENERAL CORP. Model 4535

Data General Corp. has introduced the Model 4535 dot matrix printer, which is reportedly a multifunctional unit with near letter-quality printing.

The Model 4535 is a 132-col. unit that can print from 50 to 200 char./sec. The unit incorporates self-testing capabilities and features a tractor feed and graphics support, according to a vendor spokesman.

An optional feature is an automatic sheet feeder (two sheets and one envelope bin); the vendor said. The cut-sheet feeder with multispeed and three-bin capabilities reportedly allows collation of complete mailing packages — letter, second page and envelope.

The Model 4535 is priced at \$3,995 with tractor feed, and the automatic sheet-feed option is \$1,500 for a two-bin and one-envelope-bin package, the vendor spokesman said.

Data General, 4400 Computer Drive, Westboro, Mass. 01581.

KENTEK INFORMATION SYSTEMS, INC. K-2

Kentek Information Systems, Inc. has announced the K-2 intelligent copier/printer, said to offer high-resolution merged text and graphics printing with on-board intelligence.

The K-2 can accommodate applications including word processing, design, accounting and data processing. The copier is said to be able to

merge multiple fonts, customized logos and signatures and business graphics.

Through use of electrophotographic technology, the K-2 is said to print letter-quality text and graphics from a variety of host microcomputers.

The K-2's print resolution is 240 by 240 pixel/sq in., the vendor said. Designed for high-volume printing, the K-2 is rated at 12,000 copy/mo. A variety of paper weights and sizes can be accommo-

dated. Standard 8½-by-11-in. sheets are printed at the rate of 12/min, the vendor said.

Disks can store over 30 font type styles of 154 char. each, and up to 1,024K bytes of additional random-access memory is available.

The product is priced at \$8,995 and is scheduled to be available in the fall, the vendor said.

Kentek Information Systems, Six Pearl Court, Allendale, N.J. 07401.

INNOVATIVE ELECTRONICS, INC. Innovator 202-FC

Innovative Electronics, Inc. has announced an extended communications interface capability for its 300 line/min printer system. The Innovator 202-FC now is said to provide complete IBM 2780/3730 terminal emulation.

Features reportedly include space compression and

Continued on page 72



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8550 Ulmerton Road, Largo, FL 33540

SYSTEMS & PERIPHERALS

Continued from page 71

expansion, processor interrupt reception and conversational mode.

The printer costs \$5,495.
Innovative Electronics, 4714 N.W. 165th St., Miami, Fla. 33014.

GRAPHICS SYSTEMS

PARAGON TECHNOLOGY CORP.
Model 42 Multitasker

Paragon Technology Corp. has announced the Model 42 Multitasker, a 32-bit, off-line autorouter/multitasking workstation, intended to be used as an additional node on Paragon's Series 300 Network System. The unit can also be used as an off-line workstation, compatible with Paragon's 100A and 200A printed-circuit board design graphics workstations.

Autorouting, design rule checking and data preparation functions operate concurrently with output tasks such as pen plotting, photo plotting, magnetic tape generation and report generation, according to the vendor.

The Model 42 consists of a console with a keyboard and a Digital Equipment Corp. VT100-type terminal. The CPU is a DEC LSI-11/73 running at 15 MHz. Memory capacity is 512K bytes, and the system includes three serial ports. The console accommodates an 8-in. floppy disk drive and a 20M-byte Winchester disk drive and controller, the vendor said.

The price of the Model 42 is \$30,000, the vendor said.

Paragon Technology, 2199 Norse Drive, Pleasant Hill, Calif. 94523.

PERQ SYSTEMS CORP.

Linq; Accent; Perq AI

Perq Systems Corp. has announced a networkwide virtual memory operating system, an Ethernet-based local-area network and an artificial intelligence workstation.

The Ethernet-based Linq network is said to enable Perq graphics workstations to communicate with each other and to share access to peripheral devices and computer systems from various suppliers.

Linq reportedly incorporates the virtual memory operating system — Accent — a message-based system that reportedly can be ported to other vendors' computers. Accent was designed to let remote and local processors communicate by passing messages as though they resided on a local machine.

Perq AI is an artificial intelligence workstation designed to be linked into a distributed processing network. It consists of a Perq LN-3000 workstation with Accent and Common Lisp.

Perq AI costs \$40,000, and Accent costs \$1,000. They will be available in July.

Linq is incorporated into both products.

Perq Systems, 2600 Liberty Ave., Pittsburgh, Pa. 15230.

BOARD-LEVEL
DEVICESMATROX ELECTRONIC
SYSTEMS LTD.
MSBC-QV3

Matrox Electronic Systems Ltd. has announced the MSBC-QV3 quad

video controller, which reportedly puts four independent color or monochrome alphanumeric display generators on a single IEEE-P796, Intel Corp. Multibus-compatible printed-circuit board.

Each display can have a resolution of up to 24 lines of 80 char./line, the vendor said.

The MSBC-QV3 is targeted toward multiple-display applications, such as stock trading displays, airport displays, visitor information displays and process control consoles.

Each character can be assigned one of 128 foreground/background color combinations, according to the vendor.

An on-board hardware character generator is said to contain a 128 Ascii character set, including full uppercase and lowercase alphabet, punctuation, numbers zero through

nine and 32 special graphics characters.

The MSBC-QV3 permits user interaction with each of the four displays via built-in keyboard interfaces, with each interface accepting tone-encoded data from a 16-key keyboard, the vendor said.

The MSBC-QV3 is priced at \$1,620, according to the vendor.

Matrox Electronic Systems, 5800 Andover Ave., Montreal, Que., Canada H4T 1H4.

PARALLAX GRAPHICS, INC.
1000 series

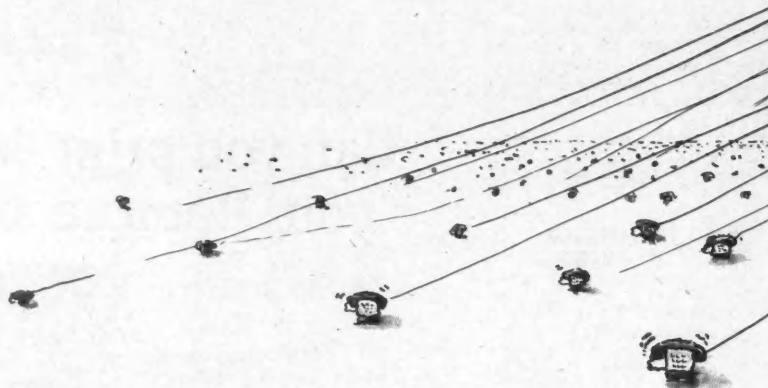
Parallax Graphics, Inc. has announced the 1000 series of color graphics controller-board sets, featuring 88 million pixel/sec drawing speed and 1,024- by 1,024-pixel resolution.

The 1000 series offers a range of features, including 14 million pixel/sec block-image transfers and 1,024- by 768-pixel, 60Hz noninterlaced display or 1,024- by 1,024-pixel, 50Hz noninterlaced display.

On-board memory is expandable from 1,024 by 1,024 pixels to 2,048 by 2,048 pixels, and standard four-bit planes provide 256 colors from a 16-million-color palette, the vendor said.

The 1000 series controllers are targeted toward computer-aided design and manufacturing and animation applications that demand flicker-free images without jagged edges.

The Model 1000 Q-4 is a Digital Equipment Corp. Q-bus, large-scale integration, quad-size controller, including control board, memory data board, video display board, cabling and software primitives. The Model

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SYSTEMS & PERIPHERALS

1000 M-4 is an Intel Corp. Multibus version.

For OEM customers, the Multibus and Q-bus board sets are offered at \$7,500 in quantity purchases, according to the vendor. The single-unit price for a three-board set is \$10,000.

Parallax Graphics, 1095 E. Duane Ave., Sunnyvale, Calif. 94086.

AUXILIARY EQUIPMENT

GULTON INDUSTRIES, INC.
Microplot 80T Video Copier

The Graphic Instruments Division of Gulton Industries, Inc. has announced a thermal copying device designed to accept input from video monitors as well as from graphics

and computer terminals.

The Microplot 80T Video Copier is said to utilize a video interface module and the company's Microplot 80T, an 8.5-in. wide printer/plotter. According to Gulton, the video copier accepts video outputs from most monitors and graphics and computer terminals. It is designed for applications where a maximum of two seconds screen freeze time is available.

Features are said to include a user-switch selectable choice of X- or Y-axis printing, designed to save print time and conserve paper; a reverse printing format to enhance printouts and reduce visual confusion and a repeat button that allows the user to reprint from the page buffer and eliminate the need for photocopies.

It costs \$2,095.

Gulton, Gulton Industrial Park, East Greenwich, R.I., 02818.

AMDAHL from page 69

to be announced either late this year or in the first quarter of 1985.

When it delayed delivery of its mainframe by 2½ years, Trilogy missed the best possible marketing window for the system. Even though Trilogy promised a beefed-up, 42- to 44-Mips dyadic processor in 1987, the system would not have been as impressive as a 32-Mips machine in 1985. And that delay surely caused some potential users to lose a little faith in Gene Amdahl's ability to give IBM another run for its money.

By deciding to market only the Trilogy wafer technology, Gene Amdahl has taken his only available option. Assuming Trilogy can iron out the problems in that technology, the move may — in the long run — prove to be a good choice.

WANG from page 69

tions.

The VS 15 uses Wang's VS operating system, which supports interactive and batch data processing, interactive program development, graphics, word processing, office information management and image processing.

The VS 15 supports Wang Office, a software product that provides an integrated set of network-based applications for Wang systems; Wang Systems Networking products for linking Wang systems and providing gateways to other vendors' products; Wang WP Plus and VS/Integrated Information System word processing; and VS Multistation windowing and graphics facilities, the vendor said.

For data processing users, the VS 15 provides data management systems and programmer productivity tools, such as VS DMS/TX, Ezquery and VS/Report. The VS 15 supports RPG-II, Cobol, PL/I, Fortran 77 and Basic. Data security can be implemented at the user, file, program or workstation level.

Wang is located at One Industrial Ave., Lowell, Mass. 01851.

PRINTER from page 69

the market — full office automation is not yet a reality."

The memo admitted that reliability problems do exist, especially among the low-volume units, and urged vendors "to step up their educational processes when installing these printers lest the public become contaminated with even more horror stories."

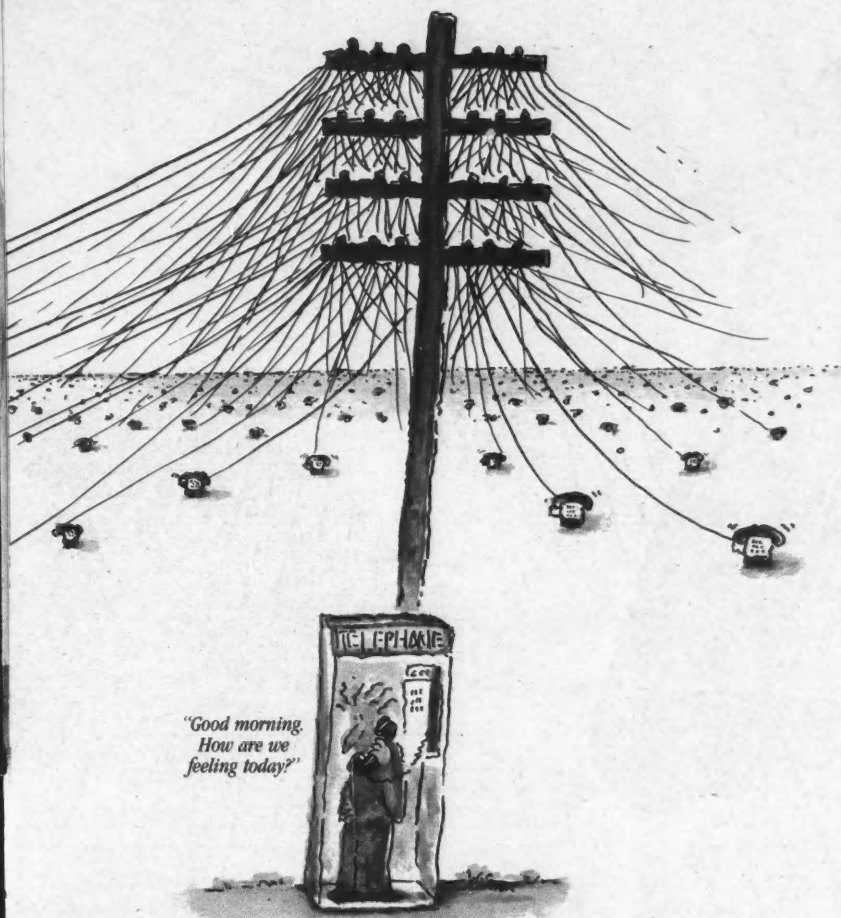
The nonimpact printers report, meanwhile, predicted that among nonimpact serial printers the leading technology will remain direct thermal, at least through 1987, the farthest point of the report's projection. Thermal transfer and thermal ink-jet serial printers, just becoming available in the U.S., will command 4.1% and 8.3%, respectively, of the installed base of serial printers by 1985, the report estimated.

"Ink-jet [serial] printers are the ones everybody is now selling, or introducing or developing — but sales just do not warrant the amount of fuss they are receiving in the trade [magazines] and in some boardrooms," the report said. Ink-jet technology for serial printers, the report continued, may become a potent force in the low-scale color graphics market, but "will never become the word processing 'dream printer' that many once thought." However, ink-jet line printers "seem destined to disappear," the report added.

The nonimpact printers report also was cool to the market for thermal transfer serial printers, saying, "The market will probably arrive, but not at the speed or with the success that so many analysts have predicted and for which so many manufacturers have hoped."

At its low end, the direct thermal printer market will get a boost, the report said, by IBM's introduction of a printer based on that technology for the IBM PCjr. That printer, it continued, will speed price erosion in that market, one currently dominated by low-cost, Japanese dot-matrix printers, and give "the Big Blue imprimatur" to such products.

IDC is located at 5 Speen St., Framingham, Mass. 01701.



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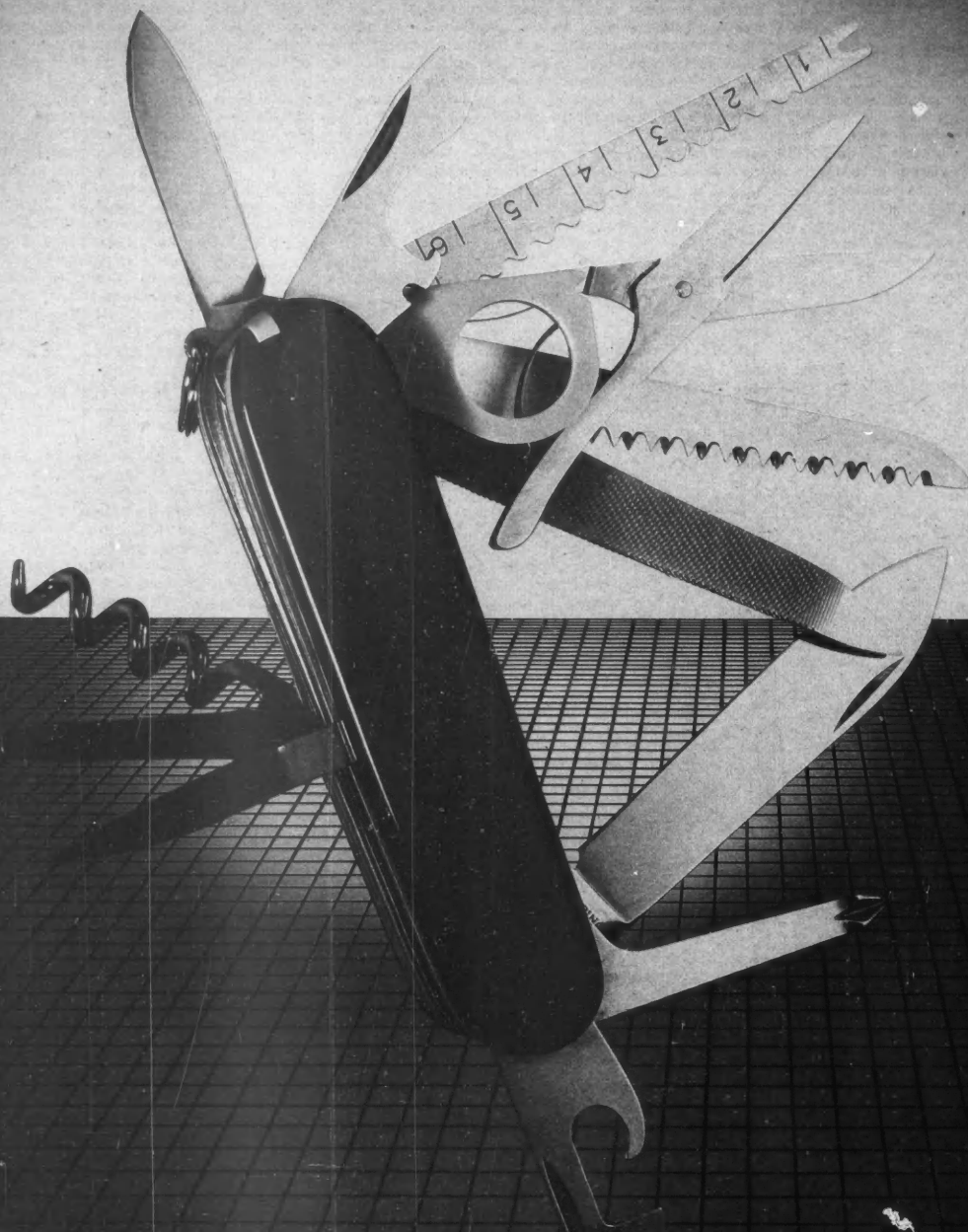
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MICROCOMPUTERS



SMALL TALK
Paul Korzeniowski
CW Staff Writer

Market research — trustworthy?

How many spreadsheets were sold last year? Where is the micro-computer market headed? Who are the viable manufacturers? How many companies are downloading data from a mainframe to a personal computer?

Microcomputer managers, bombarded with a perplexing array of issues and concerns, are willing to spend a great deal of money for answers to questions like these. Market information, *reliable* information, has become one of the most important and rarest by-products of the microcomputer revolution.

Dozens of market research and consulting firms are attempting to capitalize on this growing thirst for information. Newsletters, surveys and reports are multiplying as rapidly as integrated software packages and IBM Personal Computer-compatible microcomputers.

But many market research firms simply masquerade opinions as facts, a practice not limited to microcomputer market research. One *Computerworld* reporter recently called an author of a report filled with charts and percentages illustrating the increase in demand for Ada programmers. Asked where these statistics came from, the author replied, "[They were] just a feeling I had for where the market was going."

This practice is commonplace in micro market studies. Another author revealed that his survey was based on a number of interviews he completed while wandering among the exhibits at last fall's National Software Show.

While selling other people's perceptions as facts is not as brazen as selling your own beliefs as gospel, both practices may represent a major headache to someone basing decisions on seemingly reliable statistics.

Before relying on market statistics, managers should realize that market research is a difficult, expensive and time-consuming task. Few companies are willing to do it.

Even at best, market research is not an exact science; it largely produces estimates rather than actual numbers. "No one really knows how many personal computers were bought last year," said Robert Fertig, president of Enterprise Information Systems, Inc.

No company has the resources or the patience to track every microcomputer manufactured, so market research firms poll computer stores, data processing departments and distributors. In return for supplying needed information, these sources are compensated with a gold pen or a copy of the report — not a foolproof method of sampling.

Other problems arise because the path from a manufacturer to an end user is riddled with detours, and bookkeeping magic can disguise slow-selling products. Products gathering dust in a distributor's warehouse or a computer store's back room may be marked down as sold to end users.

See **RESEARCH** page 82

Uniform's Connector to run Unix and PC-DOS concurrently

By Paul Korzeniowski
CW Staff

SANTA BARBARA, Calif. — Uniform Software Systems, Inc. has announced an operating system utility said to allow an IBM Personal Computer XT running IBM's PC-IX operating system to run Unix and IBM PC-DOS applications concurrently.

The Connector reportedly allows the user to load (not emulate) PC-DOS, run it as a subset of PC-IX and execute a PC-DOS application.

PC-IX, a multitasking Unix System 3-compatible system, "had Unix and PC-DOS read and transfer file capabilities implanted," commented Peter Marvit, senior analyst at Yates Ventures, Inc., a Los Altos, Calif., market research firm. "The Connector is the first product which takes those pieces, integrates them with other features and allows the user to run both PC-DOS and Unix."

PC-IX multitasking capabilities allow a user to process concurrently one or more Unix applications in background and one

PC-DOS application in foreground.

"The number of applications a user can load [depends] on his hardware configuration and software requirements," Uniform founder Peter Weiner maintained. "PC-IX uses dynamic multitasking, which takes as much memory as it needs. I would think he could easily run five to 10 applications."

Users reportedly can switch from Unix to PC-DOS or vice versa by typing a one-word command. PC-IX is equipped with a file transfer feature said to allow two-way translation of PC-DOS files to Unix format.

Since its introduction in January, some analysts have questioned the viability of PC-IX. "There is a market for PC-IX," said Michael Dubrill, managing analyst at Yates. "I don't think it is a large market like the general office automation market, but a smaller market like the program development market."

Uniform hopes to transform the program development market into a general-

See **CONNECT** page 82

DG enhances Desktop micro line

By Paul Korzeniowski
CW Staff

WESTBORO, Mass. — Positioning itself in the supermicrocomputer arena, Data General Corp. enhanced its Desktop Generation microcomputer line so that two models now support eight users, two models support 16 users and all can incorporate a 38.6M-byte hard disk drive and use a variety of high-speed printers.

The Desktop Generation line consists of four models — the Model 10, Model 10 SP, Model 20 and Model 30 — each of which previously handled one to four users. Eight users are now supported on the Model 10 and Model 10 SP, while the Model 20 and Model 30 now support 16 users. In conjunction with the increased number of users, Data General introduced a four-terminal multiplexer priced at \$1,050.

A Model 10 sells for \$3,165 and comprises DG's Microclipse and Intel Corp.'s 8086 microprocessors, 128K bytes of random-access memory (RAM), 368K bytes of diskette storage and a monochrome monitor. The Model 10 SP, offered for \$3,565, reportedly adds a floating-point processor. Both microcomputers have been enhanced

to provide a maximum of 1.75M bytes of RAM rather than the previous maximum of 768K bytes.

DG said that the Model 20, priced at \$9,815, features 256K bytes of RAM, a 15M-byte hard disk, a 368K-byte disk drive and monochrome monitor. The Model 30, selling for \$11,815, is said to add a character instruction set and hardware floating-point card to the Model 20 configuration.

The systems can run DG's Rdos and Ados multiuser operating systems as well as Microsoft, Inc.'s MS-DOS and Digital Research, Inc.'s CP/M 86 single-user operating systems.

Lotus Development Corp. announced plans to provide a Desktop Generation version of Symphony, its integrated program scheduled for shipment in early July.

DG also unveiled a number of microcomputer peripheral products:

- Increased storage capacity with a maximum of 77.2M bytes housed in two 38.6M-byte hard disks, which cost \$5,745 each.

- A 132-col. dot matrix printer, priced

See **DG** page 82

SQL/DS-compatible DBMS debuts

CHESTNUT HILL, Mass. — A microcomputer data base management system said to be compatible with the IBM Structured Query Language (SQL)/Data System and Database 2 mainframe software systems was announced here by Database Systems Corp.

Database's Qint/SQL reportedly allows corporations to integrate individualized data processing on microcomputers with their centralized data bases. "No longer will DP departments have to waste time or money answering repetitive questions that do not form part of their primary areas of responsibilities," claimed Database President Stefaan De Schrijver. "Individual us-

ers can now do this on their own using Qint/SQL."

Three versions of Qint/SQL are available: Query, Query and Update and Administrator. Query was designed for users who only need to retrieve data from the data base, Query and Update for those who need to enter and retrieve data and Administrator for those who create, maintain and manage data base systems, the vendor said.

Query is priced at \$1,000, Query and Update at \$1,350 and Administrator at \$2,400. Additional information is available from Database Systems, 50 Waban Hill Road N., Chestnut Hill, Mass. 02167.

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MICROCOMPUTERS

SOFTWARE

GOLDDATA COMPUTER SERVICES, INC.

Goldatabase enhancements

Goldata Computer Services, Inc. has enhanced Goldatabase, a data base management system designed for the IBM Personal Computer using IBM's PC-DOS operating system.

The enhancements include procedure and command file capabilities, global change to a selection set, password security and modification of multiple fields within a record.

Other changes reportedly include expanded print capabilities, an easier-to-use data base edit format, new print report capabilities and expanded design features.

Goldatabase requires 192K bytes of random-access memory and costs \$350.

Goldata Computer Services, 2 Bryn Mawr Ave., Bryn Mawr, Pa. 19010.

COMMUNICATIONS PROFESSIONALS, INC.

Dlock

Communications Professionals, Inc. has introduced Dlock, a machine language extension to Ashton-Tate's Dbase II data base management system.

Dlock, a locking extension for Dbase II, reportedly provides file-level locking in a multiuser environment. Its routine resides in high memory and can be accessed directly

from Dbase command files through the CALL statement, allowing an unlimited number of users to gain shared access to common files while preventing collisions, according to the vendor.

Dlock is available on 8-in. Digital Research, Inc.'s CP/M or 5¼-in. Televideo Systems, Inc. diskettes and operates under Digital Research's MP/M, Musys Corp.'s Turbos, Televideo Systems, Inc.'s Mmmost and OSM Corp.'s Muse operating systems. It is said to be adaptable to other CP/M-compatible, multiuser operating systems as well.

Dlock is priced at \$150. Communications Professionals, Suite 1-238, 701 E. Bay St., Charleston, S.C. 29403.

SENSOR-BASED SYSTEMS, INC.

Metafile network version

Sensor-Based Systems, Inc. has introduced a networking version of its Metafile software, which is said to support most local-area network offerings for the IBM Personal Computer and the Personal Computer XT.

A new Metafile multiuser option allows multiple users to share system resources, Sensor-Based Systems said. Using Metafile, data base information reportedly can be shared by concurrent users with transaction level locking, a feature that enables multiple users to share files while protecting data integrity.

Metafile users reportedly can operate other software without leaving Metafile's integrated environment, and application developers can write

their own Metafile system extension programs and integrate them directly into the Metafile language. Other enhancements are said to permit users to control disk resource allocation.

Metafile is priced at \$995.

Sensor-Based Systems, 401 16th St. S.E., Rochester, Minn. 55904.

AUTOMATED IMAGES, INC.

Wildcard

Automated Images, Inc. has introduced a graphics editing system that reportedly allows users to create and edit two-dimensional drawing files on an IBM Personal Computer or compatible models.

Called Wildcard, the system is said to support color display and to allow users to review and edit printed wiring board data and other files. The system includes a stylus and digitizing tablet for data entry and drawing manipulation.

Wildcard reportedly can be directly interfaced with Applicon, Inc.'s 870 Graphic System and will allow present Applicon 870 users to edit their existing drawing files with IBM hardware.

Wildcard runs on systems under Microsoft, Inc.'s MS-DOS and features memory-coresident drawing file and system commands for virtually instant response, according to the vendor.

Wildcard is priced at \$8,000.

Automated Images, 53 Cummings Park, Woburn, Mass. 01801.

JMI SOFTWARE CONSULTANTS, INC.

C cross compiler

JMI Software Consultants, Inc. has announced a C cross-compiler that moves C programs from systems using National Semiconductor Corp.'s (NSC) Series 32000 microprocessors to the IBM Personal Computer.

The product is comprised of code generators for Intel Corp.'s 8088, 8086 and 80186 and NSC's 32008, 32016 and 32032 microprocessors. The package includes a cross-assembler that reportedly produces assembly listings, including addresses, object code and assembler source code. A cross-linker facilitates the construction of random-access memory and read-only memory systems, JMI said. Floating-point support is provided in conjunction with the NSC 32081 floating-point unit.

The cross-compiler costs \$1,500.

JMI Software Consultants, 1422 Easton Road, Roslyn, Pa. 19001.

INTERNATIONAL MICROCOMPUTER SOFTWARE, INC.

Datasafe

International Microcomputer Software, Inc. (Imsi) has announced Datasafe, a microcomputer encryption system.

Datasafe utilizes Data Encryption Standard, developed by IBM 15 years

Continued on page 77

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MICROCOMPUTERS

Continued from page 76

ago, to protect data transferred by modem between any microcomputer, mini-computer or mainframe, lmsi said.

The product runs on microcomputers using Digital Research, Inc.'s CP/M and CP/M 86 or Microsoft, Inc.'s MS-DOS operating system.

Datasafe costs \$135.

International Microcomputer Software, 633 Fifth Ave., San Rafael, Calif. 94901.

Fox & Geller, 604 Market St., Elmwood Park, N.J. 07470.

BITWARE COMPUTER APPLICATIONS CMRS

Bitware Computer Applications has announced Computerized Medical Records System (CMRS), a medical, laboratory and research package that runs on an Altos Computer Systems, Inc. Altos 580 microcomputer us-

ing Digital Research, Inc.'s MP/M operating system.

CMRS, an interactive package, reportedly supplies information for in-progress and completed cases. The menu-driven package allows a user to enter information with the CMRS data dictionary or supplemental screens, Bitware said. The program allows the user to link records and construct files with unlimited records and fields, according to the vendor.

CMRS, written in Fortran, costs \$7,500.

Bitware Computer Applications, 2817 Cascade Place, Davis, Calif. 95616.

JMI SOFTWARE CONSULTANTS, INC. Bastoc enhancement

JMI Software Consultants, Inc. has enhanced Bastoc, a software tool that translates Basic programs to formatted C source code.

The enhanced package re-

portedly will add Cbasic compiler dialect support to existing support of Microsoft, Inc.'s Basic. Bastoc reportedly can serve as a conventional Basic compiler when configured as a preprocessor to a C compiler. Bastoc may be tailored by the end user who can add new Basic statements and functions, JMI said.

Bastoc is available for a number of computers, including the IBM Personal Com-

Continued on page 78

DATA I/O CORP.

Promlink

Data I/O Corp. has introduced Promlink, a utility which simplifies programmer menus on an IBM Personal Computer using IBM's PC-DOS operating system.

Promlink reportedly stores operating parameters on a disk, allowing users to redefine default values or eliminate resetting values each time Promlink is run, Data I/O said. The product allows the user to recall several program menus to a terminal by keying in one-digit or two-digit commands, according to the vendor.

Promlink costs \$295.

Data I/O, P.O. Box 97046, 10525 Willows Road N.E., Redmond, Wash. 98073.

AMERICAN COMPUSOFT CO.

Flirt

American Compusoft Co. has introduced Flirt, a utility that evaluates and corrects data files.

The program reportedly will examine a file for consistent fields and field lengths and correct any aberrant records, American Compusoft said. Flirt is said to allow users to edit or create files and add records to a file.

The program works with any microcomputer using Digital Research, Inc.'s CP/M or CP/M 86, Microsoft, Inc.'s MS-DOS or IBM's PC-DOS operating system.

Flirt sells for \$295.

American Compusoft, 23113 Plaza Point Drive, Laguna Hills, Calif. 92653.

FOX & GELLER, INC.

R:Graph

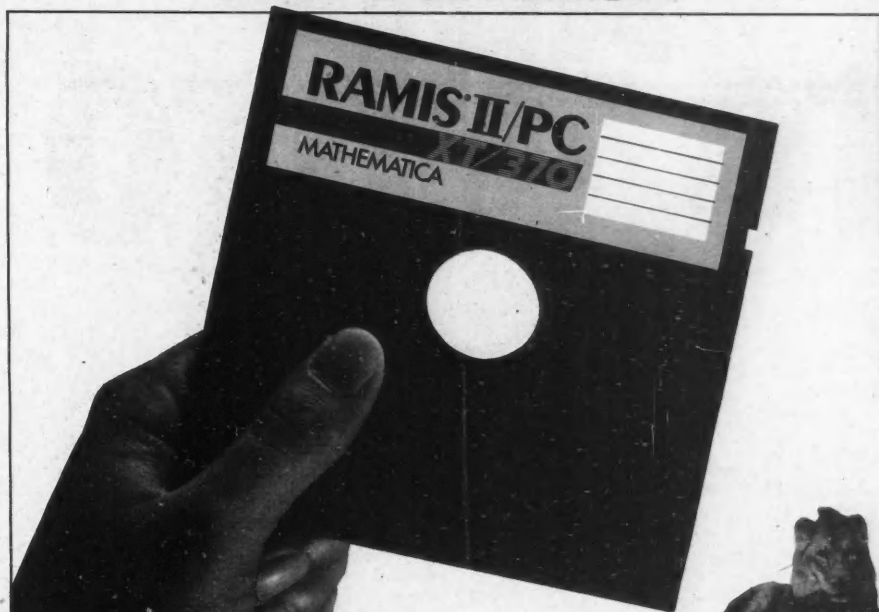
Fox & Geller, Inc. have released R:Graph, a graphics extension for Microrim, Inc.'s R:Base data base management program designed for the IBM Personal Computer XT using IBM's PC-DOS operating system.

The software reportedly allows users to chart any relation between fields in a single graph, produce on-screen color graphics and create multiple color charts on a single printout. R:Graph goes into R:Base so that users can view data that they wish to select and present, Fox & Geller said.

The program costs \$295.

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MICROCOMPUTERS

Continued from page 77

puter, Wang Laboratories, Inc. Professional Computer, Radio Shack's Model 16 and Apple Computer, Inc.'s Lisa.

Bastoc costs \$350.

JMI Software Consultants, 1422 Easton Road, Roslyn, Pa. 19001.

SOLUTION SYSTEMS

C Helper

Solution Systems has introduced C Helper, a utility program for C language programmers.

C Helper compares two files, follows insertions and illustrates differences, Solution System said. The program is said to include a cross-reference feature and a search capability for complex file patterns. The product produces a flowchart that shows how a program works as

subroutines are called, the vendor said.

The package runs under IBM's PC-DOS; Microsoft, Inc.'s MS-DOS; Apple Computer, Inc.'s Apple-DOS; and Digital Research, Inc.'s CP/M and CP/M 86 operating systems.

C Helper costs \$135.

Solution Systems, 45 Accord Park Drive, Norwell, Mass. 02061.

ROLODEX CORP.

Compucard

Rolodex Corp. has announced Compucard, an automated Rolodex card software system for the IBM Personal Computer and Apple Computer, Inc.'s Apple IIe.

Compucard, a menu-driven program, reportedly allows users to create, update and duplicate Rolodex card systems in various quantities,

formats, sizes and print modes.

The program features rapid printing of any number of card sets, the creation of a master card file through a template function, a full screen editor, dual-indexing system and a select system that enables the user to develop and control various filing methods, Rolodex said.

Compucard costs \$49.95; for \$68.50, the user receives a Rolodex file as well as Compucard.

Rolodex, 245 Secaucus Road, Secaucus, N.J. 07094.

SYSTEMS

C&W NORTH AMERICA

C&W Model 10

C&W North America has an-

nounced the C&W Model 10 micro-computer.

The C&W Model 10 features three communication ports, 128K bytes of random-access memory, two 5¼-in. disk drives, a printer port and Digital Research, Inc.'s CP/M operating system, C&W North America said.

The system reportedly is equipped with either a Bell Laboratories' 103 or 212 series modem and a text editor that features automatic word wrap, paragraph formatting, text insert and delete and screen scroll.

C&W Model 10 sells for \$1,795.

C&W North America, Suite 4700A, 1601 Elm St., Dallas, Texas 75201.

CHASE DECISION SYSTEMS

Horizon/370

Chase Decision Systems has announced the Horizon/370 turnkey forecasting system, which combines statistical, modeling and forecasting software with the IBM Personal Computer XT/370.

According to a spokesman, Horizon/370 utilizes an optimized version of the Personal Computer XT/370, featuring increased hard disk storage and faster response time. It is said to facilitate forecasting techniques such as regression analysis, including nonlinear, two-stage and pooled regression and time-series analysis.

Software provided with the system includes Chase Decision's proprietary applications packages, Lotus Development Corp.'s 1-2-3 package and IBM's PC-DOS 2.0 operating system.

Through Horizon/370, a user reportedly can access data from a mainframe as well as economic data from Chase Econometrics and other third-party data sources. The system can be used to estimate, evaluate and validate statistical models, develop forecasts, create reports and graphs and create routines to automate repetitive forecasting tasks, Chase said.

Horizon/370 is scheduled to be available in July and has a total package price of \$50,000.

Chase Decision Systems, 1000 Massachusetts Ave., Cambridge, Mass. 02138.

MONROE SYSTEMS FOR BUSINESS

MS 2000 Multi-User System

Monroe Systems for Business has introduced a multiuser version of its MS 2000 microcomputer, a system based on the Intel Corp. 80186 16-bit microprocessor chip.

The MS 2000 Multi-User System uses the Concurrent CP/M 86 operating system from Digital Research, Inc., which reportedly permits multiple users to operate a single application and share files or work from the separate data files of individual applications, such as spreadsheets.

The system is said to provide file locking, print utility, record locking, password protection, virtual consoles and multiple-user data bases.

Existing single-user MS 2000 installations reportedly can be upgraded to multiuser configurations. The MS 2000 console acts as a user workstation from which up to four different jobs may be run concurrently.

The MS 2000 Multi-User System is priced between \$11,995 and \$31,995. Monroe Systems for Business, The American Road, Morris Plains, N.J. 07950.

See **SYSTEMS** page 79

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MICROCOMPUTERS

SYSTEMS from page 78

PERTEC COMPUTER CORP.
Model 3215 enhancements

Pertec Computer Corp. has announced the enhanced Model 3215 desktop system, a member of Pertec's Motorola, Inc. MC68000-based System 3200 family of business computers, now available with up to two 53M-byte Winchester hard disk drives and a streaming cartridge tape drive.

The Model 3215, which supports up to 11 users, also can be fitted with a desktop 26M-byte or 53M-byte 5¼-in. add-on expansion unit and an add-on streaming cartridge tape drive unit. Model 3215 internal memory is said to be expandable from 256K bytes to over 1M byte.

Model 3215 measures 11-in. wide, 20-in. deep and 6¼-in. high. The unit retails for between \$6,900 and \$10,000, depending on capacity, the vendor said.

The desktop streaming cartridge tape drive is said to be able to back up 21M bytes in less than 30 minutes. The drive is priced at \$3,000.

Pertec Computer, 17112 Armstrong Ave., Irvine, Calif. 92713.

COMMUNICATIONS

DATASTREAM
COMMUNICATIONS, INC.
Execulink 3270

Datastream Communications, Inc. has introduced its Execulink 3270 software, which reportedly allows the IBM Personal Computer to emulate an IBM 3278 terminal, performing bidirectional text file transfer with a host.

Execulink 3270 is said to provide network integration for IBM Personal Computers by allowing them to transfer files to and from the host to a Personal Computer disk storage unit or attached printer, the latter via IBM 3278 emulation.

When used with Datastream's 874 Systems Network Architecture controllers, the product reportedly allows Personal Computer users to transform their machines into 3270 communicating workstations. The product also is said to permit all IBM 3270 printer functions to be performed over a single line at remote locations and eliminates the need for multiterminal workstations. Switching is available, in the IBM 3270 mode, from display to printer functions, the vendor said.

Execulink 3270 is priced at \$195. Datastream Communications, 1115 Space Park Drive, Santa Clara, Calif. 95050.

LOGICAL BUSINESS MACHINES,
INC.
L-Net

Logical Business Machines, Inc. has announced a new local-area network called L-Net.

The MS-DOS-based local-area network reportedly extends the company's Diplomat natural language for multiuser use with record- and file-level locking capability. The network allows users to link as many as 64 microcomputers, sharing data files and application programs and pooling peripherals, Logical said.

The Diplomat language was de-

signed for use on Logical's L-XT microcomputer, the IBM Personal Computer and Personal Computer XT and other IBM-compatible microcomputers. The language uses English words to create data files, entry screens and reports with less programming logic than required by conventional languages, the vendor said.

L-Net is a linear-bus network connected with twisted-pair cable of up to 10,000 feet. The network uses an Ethernet-like CSMA/CD protocol, with a data transmission rate of 2.5M bit/sec.

File server kits for converting hard disk computers for L-Net are priced at \$1,890. The hardware and software required to convert a standalone microcomputer into a workstation sell at between \$775 and \$1,200, depending on configuration. Network repeaters for each 600-ft extension

of the data bus are priced at \$615 each.

Logical Business Machines, 1294 Hammerwood Ave., Sunnyvale, Calif. 94086.

STERLING SOFTWARE
MARKETING, INC.
PC-Tracs

Sterling Software Marketing, Inc. has introduced an enhanced version of its telecommunications package that reportedly enables IBM Personal Computers to transfer data to any computer that can send or receive data in a bisynchronous mode.

PC-Tracs is said to include the following enhancements: transparency mode transmissions and turn-line, wait-time and next-file functions.

The transparency mode features reportedly allow users to transfer vir-

tually any data. The enhanced version also offers the capability to transmit and receive job streams, executable versions of programs and internal files from programs such as Lotus Development Corp.'s 1-2-3 program.

The package is priced at \$950. Sterling Software Marketing, 1007 Seventh St., Sacramento, Calif. 95814.

AVATAR TECHNOLOGIES, INC.
PA1000E

Avatar Technologies, Inc. has announced a protocol converter that reportedly enables any microcomputer or Ascii terminal to access both IBM mainframe environments and Ascii hosts either locally or remotely.

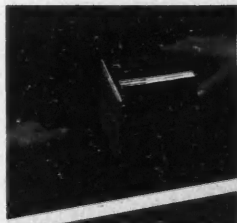
The PA1000E features read-only

Continued on page 80

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BELLE HOWELL
COM DIVISION

MICROCOMPUTERS

Continued from page 79

memory-based Help screens for some popular microcomputers, including the IBM Personal Computer running IBM 3101 terminal emulation software, the Digital Equipment Corp. Rainbow running VT100 emulation software and Apple Computer, Inc.'s Macintosh running Macterm software, a vendor spokesman said.

The PA1000E reportedly connects via coaxial cable to an IBM 3274/76 cluster controller supporting IBM Binary Synchronous Communication or Systems Network Architecture/Synchronous Data Link Control environments and through an auxiliary RS-232C port to any Ascii device, including a printer or modem for connection to an asynchronous host, public information or time-sharing service.

The unit sells for \$1,095.

Avatar Technologies, 99 South St., Hopkinton, Mass. 01748.

COMPUPRO CORP. Net 10

Compupro Corp. has introduced a network option for the Compupro 10 multiuser microcomputer, which is said to allow up to 16 users on four nodes to be networked together for less than \$100 per user.

The Net 10 network option uses Datapoint Corp.'s Arcnet protocol and requires a passive hub and RG62 coaxial cable to network four Compupro 10 four-user systems, the vendor said. The option is said to allow up to 225 nodes, or 1,020 users, to be connected over distances of up to four miles.

Microcomputers that support the Arcnet protocol, including IBM, Compaq Computer Corp. and Texas Instruments, Inc. products, also can operate on the network, the vendor said.

Net 10 features 2.5M bit/sec transmission speed using direct-memory access, as well as a number of security features, according to the vendor.

The price for the Net 10 option is \$395 for each four-user node, the vendor said. The product is scheduled for third-quarter shipment.

Compupro, 3506 Breakwater Court, Hayward, Calif. 94545.

PATHWAY DESIGN, INC. SNA/3270; SNA/3770 enhancements

Pathway Design, Inc. has announced enhancements to its microcomputer-to-mainframe communications programs that are said to increase the functionality of micros such as the IBM Personal Computer and Wang Laboratories, Inc. Professional personal computer.

The enhancements to Pathway's Systems Network

Architecture/3270 (SNA/3270) and SNA/3770 products include user exits and data redirection, which enable users to execute IBM DOS facilities and Personal Computer applications during micro-to-host communications as well as direct data to the disk in a 3270 interactive mode, the vendor said.

The programs are priced at \$595.

Pathway Designs, 177 Worcester St., Wellesley, Mass. 02181.

FOX RESEARCH, INC. 10-Net

Fox Research, Inc. has introduced a kit of hardware, software and utilities that link IBM Personal Computers and compatible systems in a 1M byte/sec local-area network.

The Fox 10-Net network reportedly allows users to share such resources as applications, files, on-line storage devices and peripherals. 10-Net requires no central

file server and works over ordinary twisted-pair wiring, Fox said. It provides record locking at the network level to allow multiple users to access the same file simultaneously with no danger of collisions at the record level, according to the vendor.

Fox 10-Net also is said to provide multiple levels of password security and network-lockout security options to maintain file integrity and control for individual users.

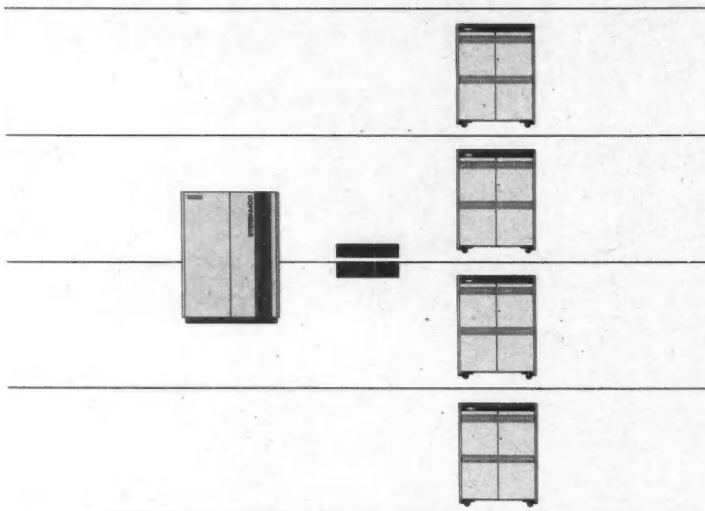
10-Net is priced at \$695 per user.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

ANDERSON JACOBSON, INC. AJ Connection

Anderson Jacobson, Inc. has introduced a plug-in modem, the AJ Connection, for the IBM Personal Computer and Personal Computer XT and compatible machines.

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VAX is a trademark of Digital Equipment Corporation. EMBOS and ENIX are trademarks of ELXSI.

MICROCOMPUTERS

The AJ Connection is reportedly compatible with the Hayes Microcomputer Products, Inc. Smartcom and other major communications software programs. The modem allows simultaneous printing and communications through use of two I/O ports, Anderson Jacobson said.

AJ Connection also is said to feature a speaker to monitor calls in process, serial and modem port configurations and a built-in asynchronous communications adapter.

The AJ Connection is priced at \$495.

Anderson Jacobson, 521 Charcot Ave., San Jose, Calif. 95131.

STORAGE

AMLYN CORP.
Model 1865

Amlyn Corp. has announced a 5¼-in. floppy disk drive that is said to be capa-

ble of storing 3.2M bytes of data on a single diskette.

The Model 1865 records at 10,250 bit/in. and 170 track/in. On each side of an industry-standard UHR-II high-coercivity 5¼-in. flexible diskette, the Model 1865 places 154 tracks. Track-to-track access time is said to be less than two milliseconds.

The drive is functionally equivalent to two 8-in. double-sided, double-density drives or two 1.6M-byte, 96 track/in. drives, according to

the vendor.

The drive normally spins a 170 track/in. diskette at 360 revolutions per minute to achieve a data transfer rate of 500K bit/sec, the vendor said.

Production volume shipments are expected to be available in the fourth quarter.

The unit price for the Model 1865 is \$330 in 1,000-unit quantities, the vendor said.

Amlyn, 2450 Autumnvale Drive, San Jose, Calif. 95131.

COMPUTER PRODUCTS INTERNATIONAL, INC.
Universal mass storage system

Computer Products International, Inc. has announced a universal mass storage system, with capacities ranging from 8M bytes to 368M bytes, for use in networks with more than 30 different computer systems.

The Winchester disk drive is designed for use in a Corvus Systems, Inc. Omninet local-area network or with up to 16 microcomputers from IBM, Digital Equipment Corp., Apple Computer, Inc. and other manufacturers, through full multiplexing capabilities.

It is said to feature a 7.5M bit/sec data transfer rate, a 16K-byte data buffer and an optional 32M-byte removable tape cartridge for backup.

Prices range from \$1,995 for the 8M-byte system to \$6,700 for the 368M-byte system.

Computer Products International, 2025 Gateway Place, San Jose, Calif. 95110.

DRAGON INDUSTRIES
Models SPF, SPT

Dragon Industries has introduced a series of backup systems for its line of Super Performance 65M-byte and 140M-byte hard disk drives.

The Dragon 3.3M-byte Model SPF backup disk drive reportedly stores eight times the capacity of double-sided, double-density 5¼-in. diskettes. It features a 500K bit/sec transfer rate. The Model SPF is optional with the firm's IBM-compatible 65M-byte and 140M-byte hard disk drive systems, Dragon said.

The Dragon Model SPF reportedly can read 48 or 96 track/in. diskettes. The Model SPF is said to be compatible with IBM's PC-DOS and Microsoft, Inc.'s MS-DOS and is priced at \$995.

A 60M-byte ¼-in. streamer tape backup, Model SPT, is also available. The ¼-in. streamer tape model is priced at \$1,995.

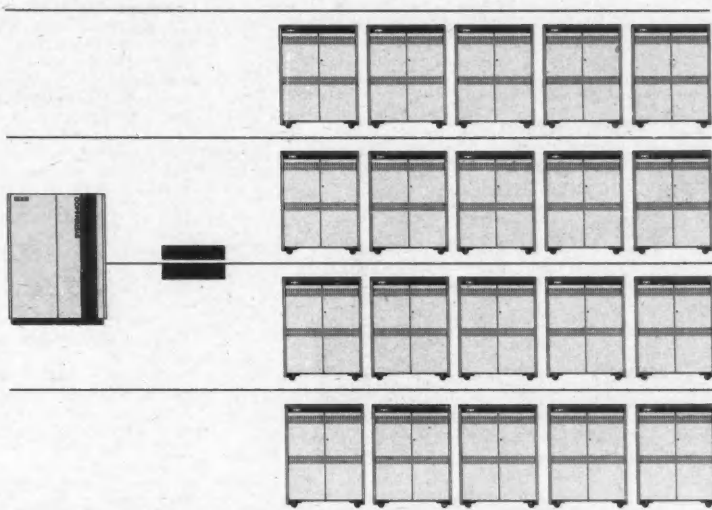
Dragon Industries, 35 Main St., Hopkinton, Mass. 01748.

HOLMES ENGINEERING, INC.
Bullet

Holmes Engineering, Inc. has introduced Bullet, a mass storage device for notebook-size microcomputers.

Bullet plugs into an RS-232 serial port, features menu-driven commands and is powered by its rechargeable battery or a power transformer, Holmes said. The product reportedly fits into a briefcase with a notebook microcomputer and stores 64K bytes of data on tape cassettes.

The device is designed for
Continued on page 82



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MICROCOMPUTERS

Continued from page 81

the Radio Shack TRS-80 Model 100, Olivetti, Inc.'s M-10 and NEC Home Electronics, Inc.'s 8021 microcomputers.

Bullet costs \$369.95, according to the vendor.

Holmes Engineering, 5175 Green Pine Drive, Salt Lake City, Utah 84107.

PRINTERS/PLOTTERS/PERIPHERALS

SHARP ELECTRONICS CORP. 12M-15BU; 12M-22U; 13M-31U

Sharp Electronics Corp. has introduced three terminals for personal computers: the 12M-15BU, 12M-22U and 13M-31U.

The 12M-15BU reportedly is a 12-in. green-on-black monitor that can display 2,000 characters on a non-glare screen. An amber-on-black model is also available.

The 12M-22U is billed as a 12-in. color monitor that features a .38-phosphor dot pitch and a 16-color display. This product reportedly has a horizontal resolution of 560 dots and a display format of 2,000 characters in an 80-char. by 25-line format.

Sharp's 13M-31U, a 13-in. CRT, features controls mounted on a front panel for easy access, allows for audio input and has a horizontal resolution of 280 lines, Sharp said.

The 12M-15BU costs \$199, the 12M-22U sells for \$549 and the 13M-31U's price is \$399.

Sharp Electronics, Systems Division, 10 Sharp Plaza, Paramus, N.J. 07652.

BOARD-LEVEL DEVICES

TAURUS COMPUTER PRODUCTS, INC. Taurus Board

Taurus Computer Products, Inc. has introduced Taurus Board, a single-board data acquisition and control system for the IBM Personal Computer.

Taurus Board combines an I/O board, termination panel and T-Soft101, a software package that provides programming tools to control the hardware and includes input, output and counting functions that can be executed in Basic, Taurus said. Up to 38 I/O signals reportedly can be accommodated by the board.

Taurus Board comes in two configurations. KS101, priced at \$1,195,

handles 16 analog input channels and 16 digital I/O points. KS102, priced at \$1,857, adds two analog output channels and four event counters to the basic KS101 configuration, according to the vendor.

Taurus Computer Products, 340 Commercial St., Manchester, N.H. 03101.

RESEARCH from page 75

Tracking who buys the machine and how it is used is impossible. "Computer store owners have no way of knowing whether a microcomputer will be placed in a home or corporation," said Harold Kinne, senior vice-president at Future Computing, Inc. Corporations often don't know how many they buy because purchases are buried in department budgets.

Consequently, even reputable market research firms' findings differ greatly.

So what can microcomputer managers needing reliable statistics do? They can be as selective choosing market research data as they are in approving software products. They can limit their choices to one or two reputable firms whose sampling methods remain consistent over time.

While these firms' estimates may not be completely accurate, they can supply a foundation on which managers can build when important purchasing and planning decisions confront them.

CONNECT from page 75

purpose market. "No one will have to wait for PC-DOS products to be rewritten under Unix," Uniform President Peter Wensburg said. "There is no impediment to upgrading a Personal Computer to take advantage of the undeniable advantages of Unix."

Marvit agreed with Wensburg's scenario. "There are a number of useful end-user applications written for Unix," Marvit said. "There are two problems with these products. They lack a clear distribution path, so buyers can't locate the packages; and despite Unix claims of portability, these packages have to be ported to different machines."

Few packages now run under PC-IX, which was first shipped last month, Marvit noted. "There are maybe 10 packages that run on PC-IX, but I think that will soon change," Marvit said.

The Connector will be available in September at less than \$300, Uniform said.

Uniform Software Systems is located at 1110 Eugenia Place, Carpinteria, Calif. 93013.

DG from page 75

at \$1,595, which prints 150 char./sec in dot matrix mode and 60 char./sec in letter quality mode. The printer is said to feature 180 by 180 dot/in. resolution, 6 or 8 line/in. printing and compression of spreadsheets requiring more than 132 columns.

■ A 180 char./sec, 132-col. printer with a \$2,995 price tag, designed as a shared peripheral.

■ A parallel line printer controller, for \$815, that reportedly supports a 300 line/min band printer.

DG is located at 4400 Computer Drive, Westboro, Mass. 01580.



Presenting MultiMate Word Processing for the Tandy TRS-80 Model 2000

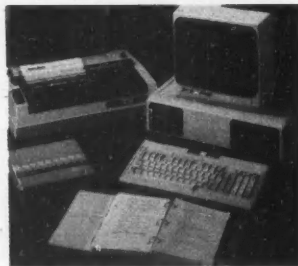
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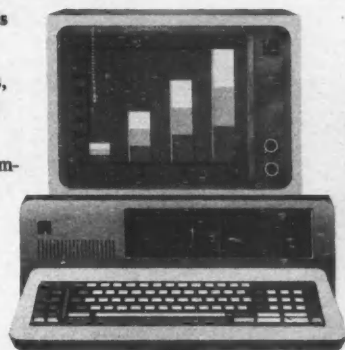
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| San Francisco | July 25 | Boston | Sept. 11 | Sacramento | Sept. 27 |
| St. Louis | July 12 | Chicago | Sept. 5 | Saddlebrook, NJ | Sept. 12 |
| August | | Cincinnati | Sept. 13 | San Antonio | Sept. 12 |
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| Los Angeles | Aug. 30 | Hartford | Sept. 27 | San Francisco | Sept. 13 |
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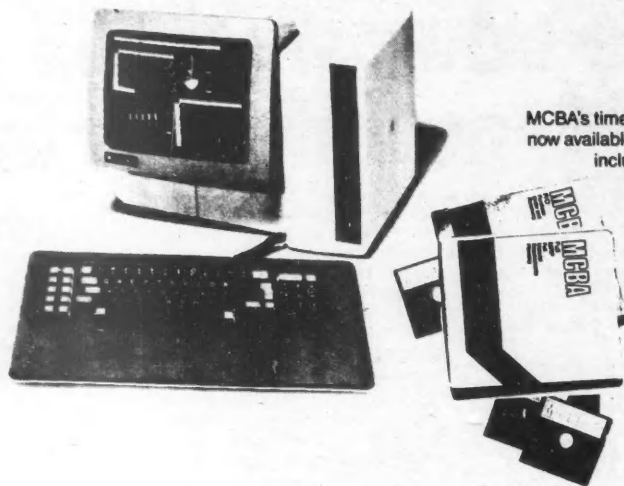
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COMPUTER INDUSTRY

Big Eight dispute apt to linger Conflict of interest issue seen as theoretical

By Peter Bartolik
CW Staff

FRAMINGHAM, Mass. — The executive who oversees Arthur Andersen & Co.'s computer services practice believes the dispute over public accounting firms offering information systems services may never be resolved.

But the dispute is an issue with only "a relatively small portion" of computer services companies, claimed Larry R. Levitan, managing director of professional competence with Arthur Andersen, who is responsible for the firm's practices in information technology.

In a recent interview here, Levitan said companies that offer both auditing and information systems services undergo rigorous scrutiny that ensures no conflicts arise from those practices.

The Association for Data Processing Service Organizations (Adapso) has, for several years, charged that the Big Eight, and particularly Arthur Andersen,

should not be allowed to offer computer services in areas where they also conduct independent financial audits.

Noting that the company works with software developers and some of the larger services and teleprocessing companies, Levitan said, "We know and work with many organizations who are part of Adapso, and the impression we have is that it is a relatively small portion of the membership who feel strongly about this."

Levitan said the conflict of interest issue is theoretical and has never been factual. "I would hope Adapso is gaining a better understanding of that," he said. While Adapso has engaged in dialogue with Arthur Andersen and others, little movement has taken place, with some members of the organization demanding the Big Eight separate their DP practices from their auditing practices.

Levitan said half of its information

See BIG 8 page 105



Ryan



Levitan

MSA, ADR report joint agreements

By John Gallant
CW Staff

CHICAGO — Management Science America, Inc. (MSA), the leading independent supplier of applications software, and Applied Data Research, Inc. (ADR), a leading independent supplier of systems software, recently said they will share technology and jointly market MSA and ADR products.

The MSA-ADR agreement, announced at a press session during the Information Management Exposition & Conference for Software here, calls for MSA to market a version of ADR/Datacom/DB and ADR/Data-dictionary along with its manufacturing, human resource and financial mainframe applications packages.

According to MSA Executive Vice-President Dennis Vohs, MSA will act as an OEM

supplier for the ADR products, offering MSA customers a restricted-use version of the ADR/Datacom/DB relational data base management system (DBMS) with which to support MSA's applications. The restricted-use arrangement will allow MSA customers to use ADR/Datacom/DB only in conjunction with the MSA products and not for the development of in-house applications.

Vohs said the ADR relational DBMS would be logically embedded in MSA's applications and transparent to users of those products. He added that MSA will deliver the ADR/Datacom/DB versions of its systems, which are currently available, with application definitions for ADR/Data-dictionary.

Vohs would not divulge the pricing

See MSA-ADR page 104

Wang disbands its Advanced Systems Lab

By John Desmond
CW Staff

LOWELL, Mass. — Wang Laboratories, Inc. has announced internally that it will soon discontinue its Advanced Systems Lab (ASL), which provided research and consulting on the human factors associated with office automation.

Twelve people employed on the academically oriented ASL staff were told to find other jobs, sources said. One Wang source described the lab's function as one of "bridging the gap between the executive's view of OA and the technologist's view of OA."

Vernell Munson, director of ASL, confirmed that the lab will be disbanded as of July 1. "Beyond that, I have no comment," she said.

According to Charles Miller, Munson's superior, ASL's functions are being transferred to research and development and marketing divisions of Wang. A decision had to be made either to expand ASL or to have it absorbed by other departments, Miller said. "Nobody has just been turned out on the street." But he added that not all the ASL staff accepted suggested transfers to other departments.

The idea for ASL came from Duncan Sutherland Jr., who recently left Wang to join a Houston design and construction firm. Sutherland said ASL was approved by Fred Wang, current executive vice-president and chief of development and the son of founder An Wang. "We realized that demand for human factor support was something the company would have to address," Sutherland said. He said his decision to "focus on customer needs and not spend a lot of time politicking internally" may have cost ASL after he left.

The reason for discontinuing ASL, according to a Wang employee who requested anonymity, was that the group "was not performing a function directly related to the bottom line of the company." However, another knowledgeable source said, "The management ... didn't really under-

See ASL page 104

\$120M

Cullinet Software, Inc. went beyond the \$100 million sales benchmark with its recent report on fiscal year 1984/91

■ Different versions of legislation designed to protect semiconductor vendors from pirating have moved through Congress and await a conference to resolve the differences/94

■ Boeing Co. disciplined some employees, and the U.S. Interior Department lifted a one-year suspension that would have barred the company's computer division from competing for government contracts/98

■ Hitachi Ltd. announced it became the third Japanese company to achieve sales in excess of \$19 billion/98

Trilogy announcement spurs speculation on Amdahl's plans



INDUSTRY INSIGHT

Robert Batt
CW West Coast Bureau

With the sudden, but not unexpected news that Trilogy Ltd. has shelved its plans to build a large-scale, IBM-compatible processor, much of the recent discussion on the Silicon Valley cocktail circuit has focused on the future of Gene Amdahl, the company's founder.

At his firm's recent annual shareholders' meeting, Amdahl, long regarded as an industry guru, was attempting to put the best possible face on his company's prospects [CW, June 18] at a time when one can only imagine he has been personally devastated by the whole episode.

"I am very sad to see what has occurred. Gene is a respected friend and competitor of all of us in the industry, but unfortunately these things sometimes happen," said David Goldsmith, vice-

president of corporate communications at National Advanced Systems, Inc.

At the shareholders' meeting, Amdahl insisted his company's decision to concentrate on wafer-scale integration technology held out the prospect for a reasonable return on investment. Some industry watchers, however, were openly questioning Amdahl's commitment to staying at Trilogy, now that his dream of building a supercomputer has been smashed.

"Quite frankly, I wonder if he'll be interested in hanging on, now that the company's focus has been so narrowed," commented Howard Hagen, director of computer industry service at Dataquest, Inc., a San Jose, Calif.-based market research firm.

"There's no doubt that Gene's credibility has suffered, and he will have a difficult time trying to finance this sort of venture again," added Greg Kelsey, senior technical analyst at Hambrecht & Quist, an investment firm based in San Francisco.

In the weeks and months ahead, much will

depend on Trilogy's efforts to broaden the market for its wafer-scale integration technology. Currently, three companies — Sperry Corp., Digital Equipment Corp. and France's CII-Honeywell Bull — have bought licenses for the wafer technology, in return for some hefty investments in Trilogy.

Ask investors to cough up more cash?

Some pundits think Trilogy will ask these computer vendors to cough up even more cash and possibly do some of the development work themselves.

Nevertheless, according to Floyd Kvamme, general partner at Kleiner Perkins Caufield & Byers, a San Francisco-based venture capital firm, the three manufacturers may actually gain by Trilogy's fall from grace.

"They may view this change positively, because the technology for which they invested in Trilogy will now be the primary focus of the company, rather than only one part of it," he remarked.

COMPUTER INDUSTRY

Personal CAE workstation targeting large market



OUTSIDE LINES
Bohdan Szuprowicz

The powerful computer-aided engineering (CAE) workstations introduced during the last two years have only just begun to carve out a market for themselves, but already they are being challenged by the personal computer-based engineering workstations that are becoming available at a fraction of the cost of the larger systems.

Both are targeting a huge population of up to 500,000 electronic circuit design engineers worldwide,

most of whom have yet to use such automation devices in their tedious and increasingly complex tasks of integrated-circuit design.

The personal CAE workstation allows an electronic design engineer to use the ubiquitous IBM Personal Computer to capture the design and develop the logic of an integrated circuit. He can then send his computerized design data over the phone to a semicustom integrated-circuit manufacturer and literally sit back and wait for a finished, customized microchip prototype to arrive a few weeks later.

It was only yesterday that specialized very large-scale integration (VLSI) CAE workstations appeared

on the scene, wresting away the critical integrated-circuit design market from the more general computer-aided design (CAD) suppliers who did not specialize. Companies like Daisy Systems Corp.; Mentor Graphics Corp.; Valid Logic Systems, Inc.; Silver-Lisco, Inc.; Metheus Corp.; and CAE Systems supplied sophisticated software systems integrated into powerful 32-bit micros or minis with networking capabilities and literally took the VLSI design market by storm.

However, although those workstations are a vast improvement over the general CAD systems and often much cheaper, they are nevertheless too expensive and too complex to be

operated by the vast majority of electronic circuit designers. This is where the personal CAE workstation comes in. Already industry observers predict that anyone who can package such a system for less than \$15,000, and make it simple enough to operate for an average electronic engineer who is not an expert in integrated circuit design, has an excellent chance of making it big in this exploding market, if he only moves fast enough.

Suppliers of personal CAE workstations and services are betting on a new, competitive scramble among manufacturers of any product with an electronic circuit, from self-diagnostic dishwashers to talking automobiles, intelligent robots and voice/data telephones. Use of custom integrated circuits can set such products apart from your competition, and the new personal CAE workstations are the cost-effective tools that make it all possible.

There are already a few thousand sophisticated VLSI CAE workstations installed, primarily used by the custom integrated-circuit fabricators and large electronics manufacturers. The latest industry estimates suggest, however, that by the end of 1984 as many as 100,000 IBM Personal Computers will be used in electronic circuit design, and all of those have the potential to become low-cost personal CAE workstations. In fact, a two-tier market is shaping up in which personal CAE units will be used for initial circuit design, schematic capture and network listing, which are then transmitted to a design center with more sophisticated VLSI CAE workstations and mainframe computers. There, expert integrated-circuit engineers can check the logic and develop the remaining data required to produce your proprietary custom microchips.

As a result, several new companies are rushing in to offer personal CAE workstations on the IBM Personal Computer, which can also double up in many other administrative and computing tasks for which software packages are readily available. Most newcomers offer specialized software that makes an IBM Personal Computer a personal CAE workstation and also provide access to a more powerful design center and a choice of two or more microchip fabricators. This is critical to the design engineers who like to have an assurance of several sources for a particular microchip with which they are developing new products. Second sourcing in this game is another tactic of survival in this very competitive business.

FutureNet is emerging as one of the leading personal CAE workstation suppliers, claiming more than 1,000 IBM Personal Computer-based installations worldwide, with units operating in nine of the top 10 electronic firms in the U.S. The company also signed an agreement with LSI Logic, a leading custom gate array microchip manufacturer, which will supply its library of parts, and with HBB-Softtron for logic simulators to

See VLSI page 104

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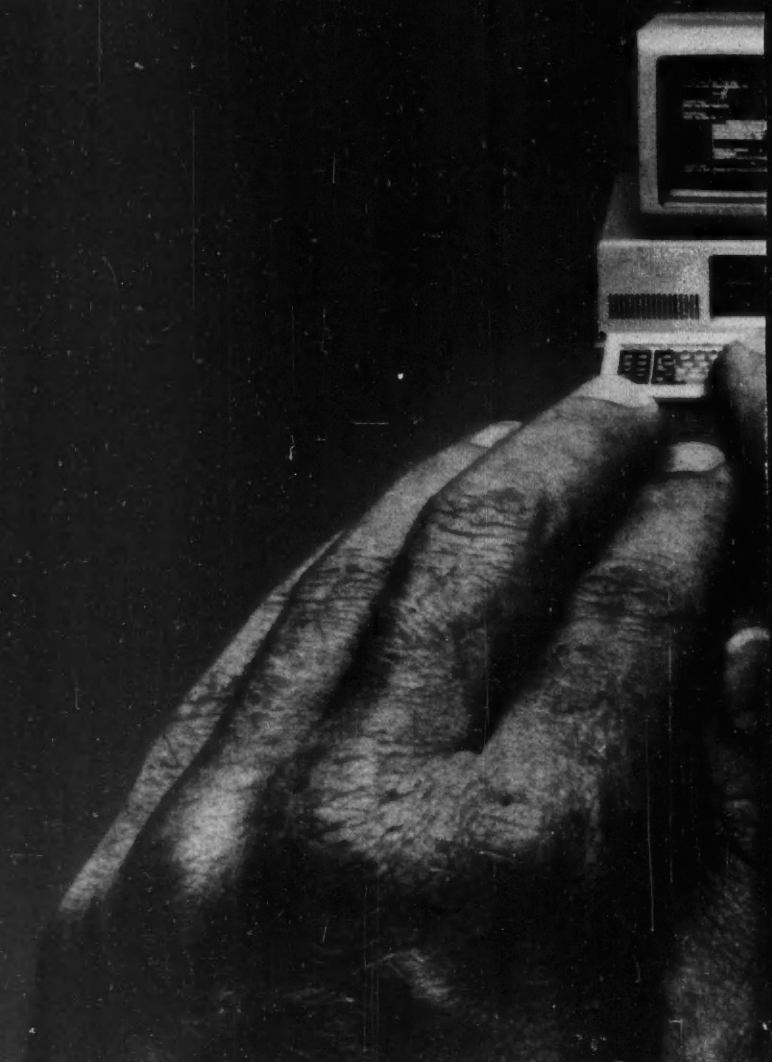
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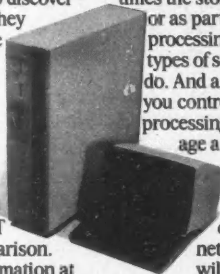
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PERSONAL COMPUTER NOT ENOUGH.



from 40 million characters to 214 million. Translated, that means it will hold anywhere from 13,000 to 71,000 pages of text (it's not for short story writers) or from 260,000 to 1,420,000 names and addresses (you'd better have plenty of friends).

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COMPUTER INDUSTRY

Imposing legal liability on DP vendors: two theories



LEGAL VIEW

By Christopher M. Mielow
Special to CW:

First of three parts

Despite revolutionary technological advances, the computer industry has not yet devised a way to circumvent Murphy's Law.

Computer system malfunction is not inevitable, but it is far from infrequent. The financial losses sustained by users of malfunctioning computer systems can sometimes de-

stroy a user's business altogether.

Computer system malfunctions have spawned a proliferation of lawsuits rivaling the growth of the computer industry itself. So far, legal liability has been imposed upon computer system vendors primarily under two theories: breach of warranty and fraud.

Contracts for the sale of goods are governed by the Uniform Commercial Code (UCC). Under the UCC, a vendor may be held liable for his breach of an express warranty, for his breach of an implied warranty or both.

Express warranties do not require any talismanic words such as "warranty." Any statement of fact con-

cerning the goods to be sold or any description of these goods will give rise to an express warranty that the statement or description is true.

Although they often arise from statements made in a sales document, express warranties can be created orally as well. In one case, for example, Burroughs Corp. had agreed to sell to an automobile dealer a small computer to be used for accounting purposes. Although the written contract mentioned only hardware, Burroughs' salesman had orally agreed to provide 13 application programs designed to meet the user's needs. These programs were delivered, but were never operable. As a result, Burroughs was held liable for breach

of express warranty.

An implied warranty, as the phrase suggests, does not require any statement by the vendor. An implied warranty that goods are "fit for the ordinary purposes for which such goods are used" arises automatically.

In addition to this general implied warranty, there also exists an implied warranty of fitness for a particular purpose. A warranty that the goods are suitable for a special purpose is deemed to accompany the sale when a vendor has reason to know of some special purpose — beyond "the ordinary purposes for which such goods are used" — for which a purchaser needs the goods in question and is aware that the purchaser is relying upon the vendor's skill to select suitable goods.

The second legal theory upon which computer system vendors have been found liable is fraud. Fraud occurs when a person makes a false representation of fact, knowing at the time that it is untrue. Although instances of deliberate fraud are rare, fraud also occurs when a misrepresentation of fact is made recklessly, without regard for whether the representation is true or false. Under this less rigorous standard, a number of computer system vendors have been found liable for fraud on the basis of overzealous sales pitches.

Fraud and breach of warranty are relatively traditional legal theories that may be difficult to apply to dynamic changes in computer technology. As the computer industry evolves, therefore, it is likely that new legal theories will be adopted, or at least existing ones adapted.

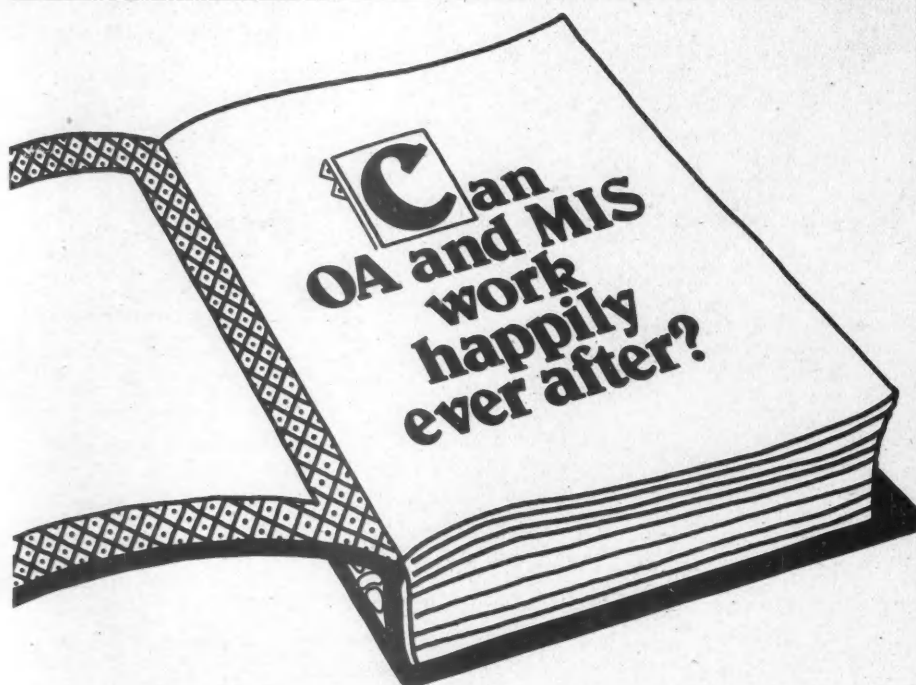
One phenomenon which is already creating pressure for new theories of legal liability is the increasing disparity in expertise between computer vendors and users. No longer is the computer market restricted to large institutional mainframe users; microcomputers have opened up the market to a class of smaller, far less sophisticated users. The pace of technological change, moreover, has left even many experienced users in the position of virtual neophytes.

Consequently, users often have unrealistic expectations. They frequently tend to view the computer not as a complex system with specific advantages and limitations for specific applications, but rather as a mysterious panacea that will somehow instantaneously and cost-effectively solve whatever problems prompted them to consider automation in the first place. Not all users are this naive, of course. Nevertheless, most depend on their vendor's expertise and are thus easy prey to a smooth sales pitch.

Because so many users are unable to protect themselves when purchasing a computer system, several new theories of legal liability have been proposed in order to ensure the purchasers of deficient computer systems of an effective remedy.

One such theory is computer malpractice. Like doctors and lawyers, it is argued, computer vendors possess

See LAW page 104



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Mielow is an attorney with the Salt Lake City firm of Giaque and Williams.

COMPUTER INDUSTRY

Cullinet's revenues break \$100 million sales threshold

WESTWOOD, Mass. — Breaking the \$100 million sales threshold, Cullinet Software, Inc. reported recently that revenues for the fiscal year ended April 30 were \$120 million, a 53% increase over the \$78.3 million reported in the previous year.

Profits for the year were \$16.4 million, or \$1.09 per

share, a 43% increase over the previous year, when profits were \$11.5 million, or 81 cents per share.

For the fourth quarter, which ended April 30, the company reported revenues of \$35.1 million, a 50% increase over the \$23.4 million reported in the previous year.

Profit for the quarter was

\$4.8 million, or 32 cents per share, compared with \$3.5 million, or 23 cents per share, in the year-earlier period, representing an increase of 36%.

The company also reported that costs and expenses for the year climbed 53% over the previous year to \$95.1 million. For the quarter, costs and expenses

climbed 50% over the year-earlier period to \$27.9 million.

The company noted that it has reported 50% or greater growth in revenues in each of the past five years.

Robert N. Goldman, president and chief operating officer, said, "Cullinet is especially pleased to have achieved another milestone

in the company's history this year by exceeding \$100 million in revenues.

"Our increased presence in the applications sector of the software market and the increasing acceptance of our one-vendor solution to data processing needs have provided us with the means to reach this measure of success."

IBM names fellows, awards cash

SAN FRANCISCO — Five specialists in such fields as data communications, computer programming and material science were recently named IBM fellows, the computer giant's highest technical honor for its employees.

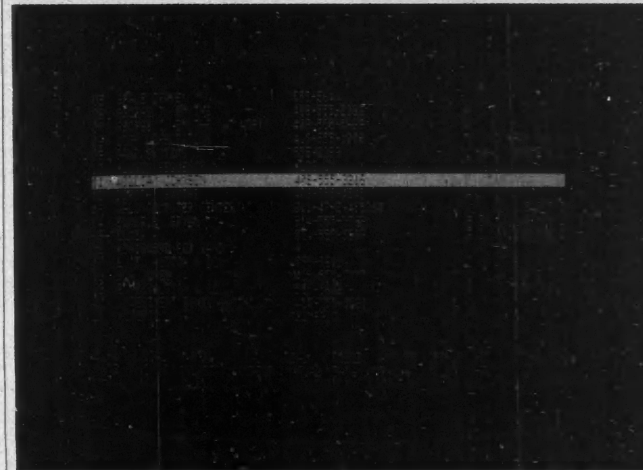
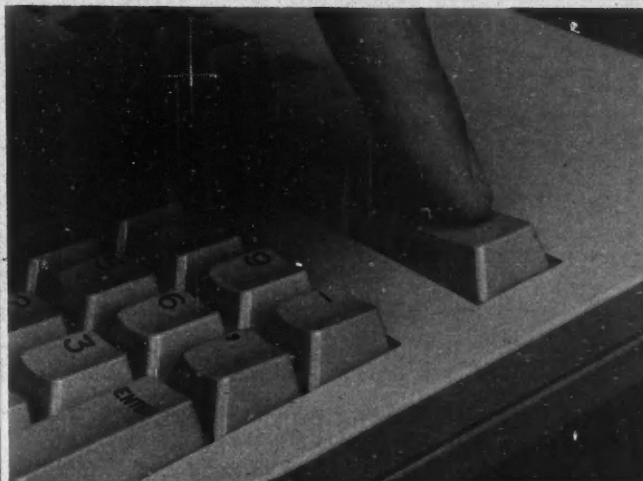
IBM also announced cash awards totaling more than \$2.7 million, recognizing the achievements of 79 other employees. The awards were announced at IBM's annual technical recognition event here June 7.

The five new fellows are Dr. James P. Gray of the Communications Products Division in Raleigh, N.C., who specializes in the area of communications architecture; Dr. Mu-Yue (Ben) Hsiao of the Data Systems Division in Poughkeepsie, N.Y., who specializes in the fields of computer reliability, availability and serviceability; Dr. Allan L. Scherr of the System Products Division in White Plains, N.Y., who is a leader in the development of operating software for large IBM systems and networks; Dr. Rao R. Tummala of the General Technology Division in East Fishkill, N.Y., a specialist in materials science; and Dr. Gottfried Ungerboeck of the IBM Research Laboratory in Zurich, Switzerland, a specialist in data transmission and signal processing.

The IBM fellows are selected for their sustained technical achievement and can pursue research and technical projects of their choice for at least five years.

Included in the total cash awards were two special corporate products awards totaling more than \$1.7 million. Those awards were shared by 48 employees for development and manufacturing efforts involving the IBM Personal Computer and the IBM 3380 direct-access storage device.

Awards amounting to \$955,000 were presented to 31 employees for their various innovations in IBM products.



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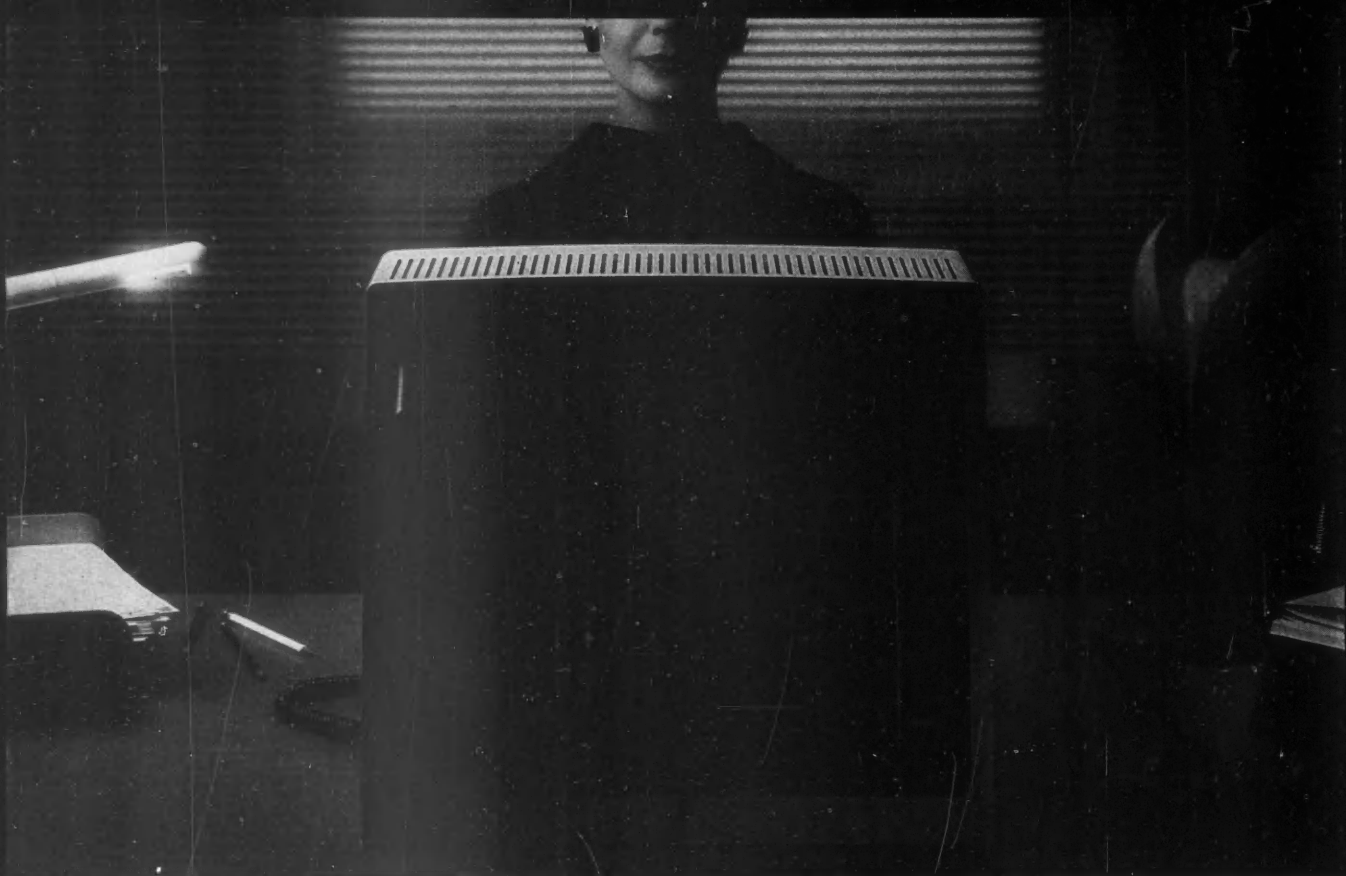
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In the interest of operator productivity, write to Teletype Corporation for more information on the 5410 at: 5555 Touhy Ave., Dept. 3223-F, Skokie, IL 60077. Or call 1 800 323-1229, ext. 101.

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COMPUTER INDUSTRY

IBM micro price cuts seen disguising deeper problem

By Robert Batt
CW West Coast Bureau

SUNNYVALE, Calif. — IBM's recent price cuts for its Personal Computer were designed, in part, to disguise weaknesses in the product's competitive position, according to Will Zachmann, vice-president of corporate research at International Data Corp. (IDC).

Speaking at a breakfast session recently on "User Buying Patterns and Distribution Trends," sponsored by the Framingham, Mass.-based market research firm, Zachmann said the "myth of IBM's invincibility" is now being sorely tested.

According to Zachmann, the recent price cuts suggest that the Personal Computer has reached the climax of its popularity much more quickly than anyone predicted.

'Defensive move'

"It just could be that IBM is building up a massive inventory of [Personal Computers] in its distribution pipeline, and the only way to get rid of [the computers] is to sell them cheaply. From that point of view, the price cuts are a defensive move, rather than the aggressive one they were painted to be," he asserted.

The notion that low-cost production and commodity pricing are the ways to maintain a competitive stance in the marketplace is a doubtful one, Zachmann continued.

What will make the difference in determining the survivors and winners over the next five years, he suggested, is innovative products that give the user access to relevant technology and the ability of vendors to tell the story of such innovation in a way that customers themselves consider the innovation useful.

Apple setting tone

In this regard, Zachmann said, Apple Computer, Inc., with its Macintosh computer, is setting the tone for 1984. "Through the Mac, Apple has brought into existence an innovative technology that is changing the rules of the game this year, and the myth that microcomputer vendors must be IBM-compatible has been broken," he claimed.

The issue of pricing was also raised at the briefing by Aaron Goldberg, IDC's research manager. He referred to the "phantom elasticity of pricing," in which merely having a 5% to 10% better price/performance per feature will not make any real difference, he asserted.

"As an industry, we get caught up with thinking that innovation is a purely technological phenomenon. Technological elegance, however, is not a measure of innova-

tion, user acceptance is," Goldberg told his audience.

Complacency problem

There is, he claimed, a problem of complacency in the microcomputer industry with most vendors afraid to take the first step.

However, "understanding the need of users before the user does is the name of the

game," he added.

A third speaker at the briefing, Gene Collins, vice-president of distribution for World of Computers, a Denver-based microcomputer franchise company, focused on the role that vendors should play in supporting their dealer networks.

The job of the dealer, he noted, is to sell products,

rather than to be tied up with maintenance or technical support efforts. It is critical that vendors give their dealers adequate training at the outset in order to minimize the amount of time spent on post-sales customer service.

"Vendors can attract a great deal of loyalty from their dealers, but only if they share their product plans

with them and maintain confidence in the relationship between the two parties.

"If, for example, the vendor floods the various distribution channels with the same product, the confidence of the dealer network will soon disintegrate, and prices and the perceived value of the product will both drop," he warned.

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COMPUTER INDUSTRY

Senate, House approve bills to protect chip makers

By David Olmos
CW Staff

WASHINGTON, D.C. — Legislation designed to protect semiconductor chip manufacturers from illegal pirating has been approved by both congressional bodies, though in different forms.

The House on June 11 approved a bill that would give chip makers the exclusive right to sell and distribute their designs for 10 years. The bill was passed unanimously under suspended House rules that waived debate.

A Senate bill approved in May also

seeks to offer protection for chips, but it takes a different approach from the House bill.

Senate version

The Senate version would recognize chip designs as "intellectual property," much like a book or record, protected by the U.S. Copyright Act of 1976. Like the House version, the Senate bill would protect the chip makers' rights for 10 years.

The House bill does not offer copyright protection, but would set up a unique kind of registration for the "masks" used to produce chips.

Rep. Don Edwards (D-Calif.), who sponsored the House bill, said the legislation culminated six years of effort by the industry to combat chip piracy.

Richard Stern, a copyright and patent attorney representing the Semiconductor Industry Association, a San Jose, Calif., trade group, said the group supports both the House and Senate bills.

Both the Copyright Office and the Association of American Publishers have supported the House version, arguing that chips are a "useful" item that should not come under the same kind of copyright protection as a book or music.

Stern said the industry does prefer one provision of the Senate bill that makes protection available as of Jan. 1, 1980. The House version would make protection effective the beginning of this year.

"The effective date is a dollar and cents issue," Stern said. He noted that some leading microprocessor models, such as the Motorola, Inc. 68000, Zilog, Inc. 8000 and Intel Corp. 80186, came to market between 1980 and 1984.

Another difference between the bills that will have to be ironed out by the House and Senate pertains to the penalties for chip piracy. The House bill contains no criminal penalties, but establishes civil penalties of up to a \$250,000 fine. The Senate version, on the other hand, incorporates the civil penalties set forth in the copyright act.



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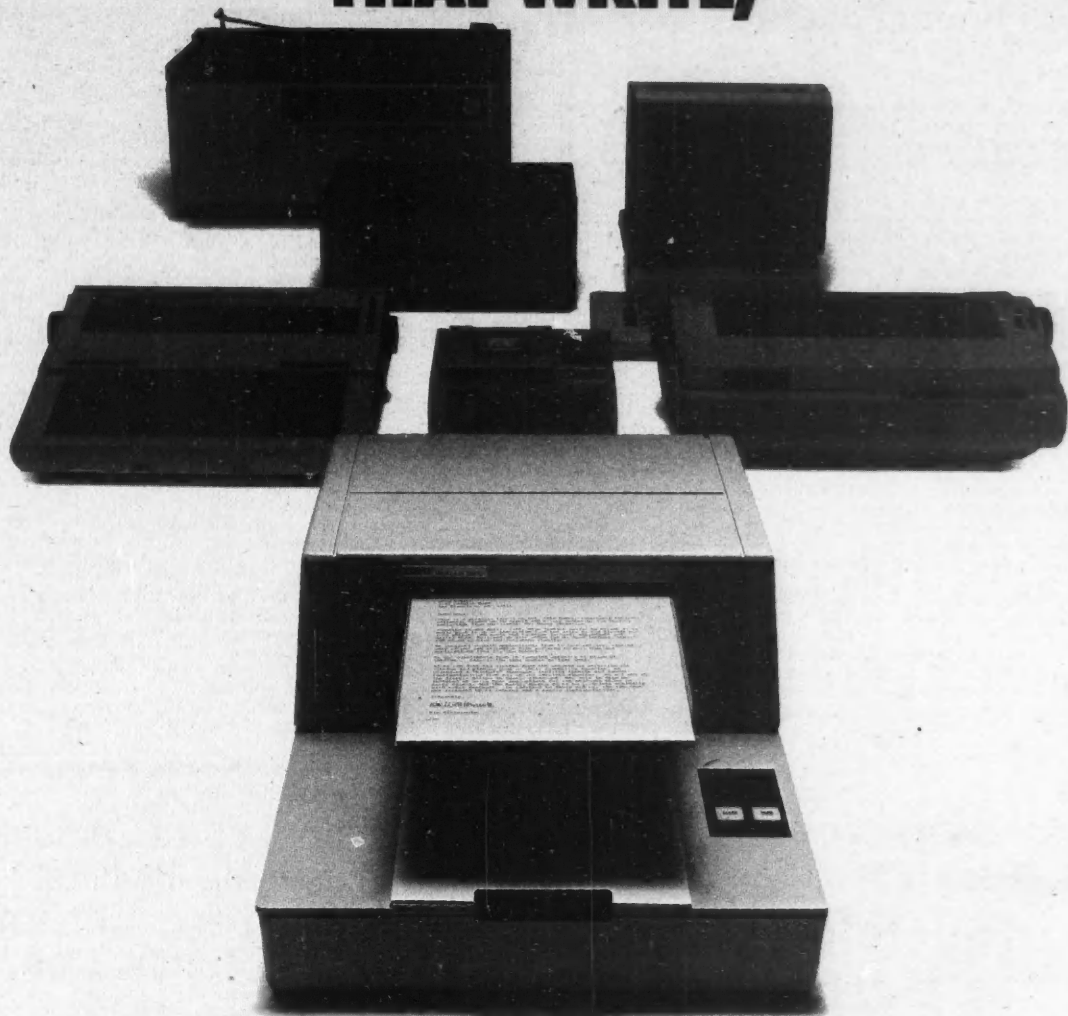
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COMPUTER INDUSTRY

Government lifts ban on Boeing pacts

By David Olmos
CW Staff

WASHINGTON, D.C. — The Interior Department recently lifted a suspension that would have barred Boeing Co.'s computer group from bidding on any government contract for at least a period of one year.

An agreement reached June 15 between the government and the aerospace concern cited certain disciplinary actions taken by the Boeing Computer Services Co.'s Federal Systems Group. Harold Carr, a spokesman for Boeing in Seattle, said more than 10 employees in the computer unit have been fired, suspended without pay or issued reprimands.

Last month, the Federal Systems Group was barred from receiving government contracts after federal investigators accused it of illegally obtaining and benefiting from bid information submitted by other bidders. The incident involved a \$5 million software development contract Boeing won from the National Park Service earlier this year.

Federal investigators determined that officials of the group had helped to write some of the criteria used to evaluate the bids and had failed to notify the government of the conflict of interest violation. The contract has since been rescinded.

Tom Wilson, a spokesman for the Interior Department, said Boeing took the disciplinary action "on its own initiative."

"We took action because we obviously found that certain employees had not lived up to the conduct we expect of an employee," Carr said.

Wilson said the inspector general is continuing an investigation into the role that Interior Department or Park Service officials may have played in helping Boeing to obtain the confidential bid information.

IBM names director of economics

Responsible for conducting economic studies, analyses

ARMONK, N.Y. — Nancy H. Teeters has been named director of the economics department at IBM, succeeding Alvin J. Karchere, who retired from IBM last November.

Teeters will be responsible for conducting IBM's economic studies and analyses and for consultation on economic matters.

Teeters was the first woman to serve as a governor of the Federal Reserve Board. She was appointed by former President Carter to that post in 1978. Her term expired in January, and she has

continued in that position pending the nomination of a successor, whom President Reagan recently nominated.

From 1974 to 1978, Teeters was the chief economist for the House Budget Committee. From 1973 to 1974, she served as a senior specialist at the Congressional Research Service of the Library of Congress.

Prior to that position, she was a senior fellow at the Brookings Institution in Washington, D.C., from 1970 to 1973.

CAE seen vital to U.S. role in foreign marts

BOSTON — Computer-aided engineering (CAE) will be vital to the competitiveness of U.S. businesses in the international marketplace, a computer company executive remarked here recently.

"American business has been pressured by foreign competition, the need for higher productivity and a shortfall of engineering talent," said Charles M. Hevenor, president of Engineering Automation Systems, Inc., a Wethersfield, Conn., maker of CAE workstations. "Advances in high technology are essential to meeting these challenges."

In remarks at the Computer-Aided Design Conference East trade show here, Hevenor asserted that CAE/CAD can help solve some of the problems facing U.S. industry.

Cooperation key

"With the cooperation of business, government and educational institutions in basic and applied

research, we will fully use and expand new technologies that will further strengthen our ability to compete in the global marketplace," Hevenor maintained.

Hevenor said he believes American business is moving to develop the new engineering technologies to achieve the kind of advances he deems necessary. He cited applications software and hardware with powerful computational capabilities that address highly specialized CAE requirements.

"The impact of the personal computer as an engineering workstation has been substantial and has helped us meet many of the challenges facing us," he said.

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- dynamic adjustment of screen size support
- exit routines
- member name length up to 32 characters
- access control by sub-library, member, or access type
- Help screens
- implied objects of commands (uses last referenced member name)
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COMPUTER INDUSTRY

Hitachi profits, sales hit sixth all-time high

NEW YORK — Hitachi, Ltd. announced here recently that the fiscal year ended March 31 produced its sixth consecutive all-time high in profits and sales and that it became the third Japanese company to attain sales in excess of \$19 billion.

In dollar figures, calculated at the exchange rate prevailing on the Tokyo Foreign

Exchange Market as of March 31, the giant electronics and electrical equipment manufacturer registered net sales of \$19.4 billion, an 11% increase over the previous year.

Profits were \$743 million, or 26 cents per share, also 11% ahead of the previous year, when profits were \$669 million, or 24 cents per share.

An Hitachi spokesman said the results were attributable to "a remarkable advance by the electronics division, which realized a 29% increase [in revenue] over the previous year. Semiconductor operations showed an especially large increase of 45%, while the size of the computer operations expanded by 22%."

Revenues from information and communications systems and electronics devices were \$5.2 billion in the fiscal year just ended, compared with \$4.04 billion the previous year.

International sales revenues by all Hitachi segments were \$5.4 billion, up from \$4.8 billion the previous year.

Wang sets Intecom stock pact

LOWELL, Mass. — Wang Laboratories, Inc. and Intecom, Inc. have completed a stock purchase agreement announced last April that provides for a comprehensive joint development relationship between the two companies.

Under the agreement, Wang has acquired 1.5 million shares of Intecom common stock for \$22.5 million. In addition, Wang and Olivetti Realty N.V., a subsidiary of the Italian office equipment maker, have reached an agreement in principle, whereby Wang will purchase 1,757,000 shares of Intecom stock held by Olivetti.

Wang's purchase of the Intecom and Olivetti shares, combined with Wang's purchase of more than 1.7 million shares on the open market, constitute more than a 15% interest in Intecom.

Intecom is an Allen, Texas-based manufacturer of voice and data communications equipment.

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School starts CAD center

BERKELEY, Calif. — Construction has begun on an \$18 million research center for the computer-aided design (CAD) of microelectronic circuitry at the University of California's campus here.

The purpose of the facility, scheduled for completion next year, is to develop improved computer-aided design equipment that will be used to design, manufacture and test advanced chips.

Fifteen computer companies are providing construction funds and computer equipment for the center, including Advanced Micro Devices, Inc.; Hewlett-Packard Co.; Hughes Aircraft Co.; IBM; Intel Corp.; National Semiconductor Corp.; and Tektronix, Inc. All 15 firms will be able to send a researcher to the center.

Most of the research will be carried out by graduate students and faculty in the Department of Electrical Engineering and Computer Sciences and the Electronics Research Laboratory.

Among the projects planned for the center is the development of computer programs to create and "edit" new patterns of microelectronic circuitry. The programs also are said to have the capacity to reduce the size of proposed circuits.

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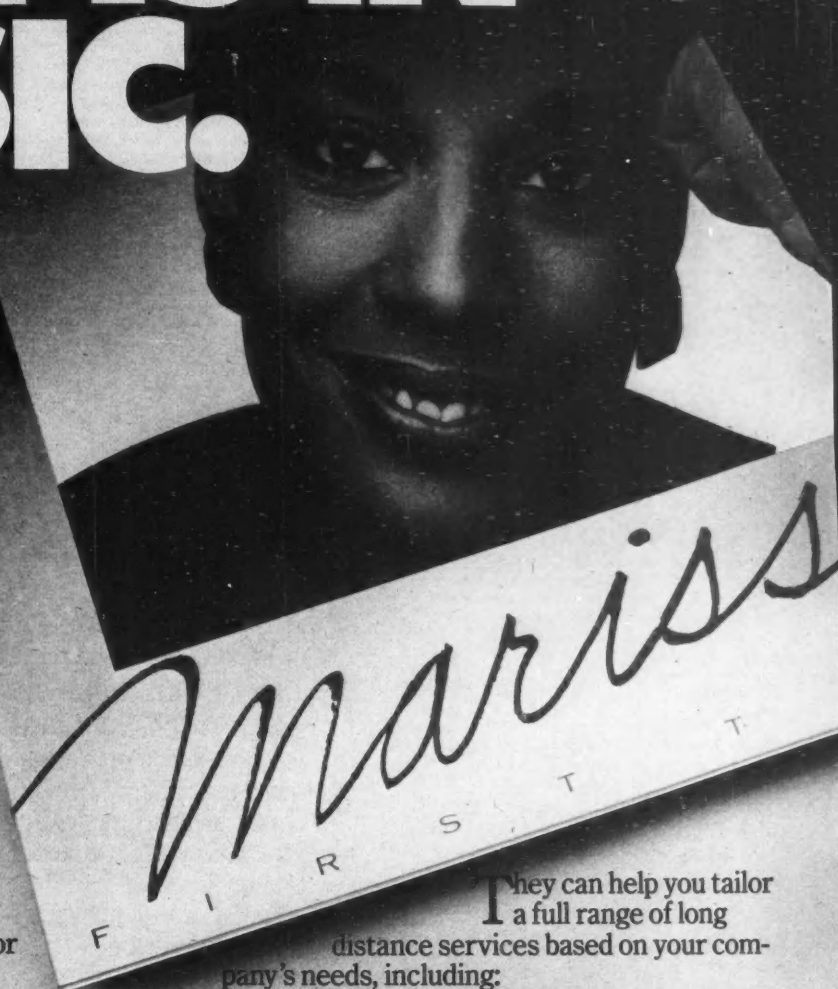
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COMPUTER INDUSTRY

Printronix files suit against Tally for alleged patent infringement

LOS ANGELES — Printronix, Inc. has filed suit in federal court against Mannesmann Tally Corp., charging patent infringement relating to the company's sale of computer printers.

Filed in U.S. District Court for the central district of California here, the suit alleges that Tally, a Kent, Wash.-based terminal and peripherals manufacturer, infringed on U.S. patents owned since 1974 by Printronix, a printer manufacturer based in Irvine, Calif.

The suit specifically accuses Tally of using Printronix patents in the design, manufacture and sale of its MT630, 660 and 690 line of dot ma-

trix printers. According to David Mayne, Printronix senior vice-president, the patents involve the hammer imprinting mechanism and shuttling device that permits dot imprinting.

The suit seeks an unspecified amount in damages and an injunction against Tally ordering it to cease its alleged infringement activities. Mayne said the action against Tally is consistent with the company's "stated policy" to enforce its patent rights in court.

John Cooper, director of product marketing for Tally, said, "We do not believe we have violated any valid Printronix patents."

Wicat Systems reports loss

OREM, Utah — Wicat Systems, Inc. reported a \$13.4 million loss, representing 70 cents per share, for the fiscal year ended April 1, as revenues declined by 8% from the previous year. For the fourth quarter, the microcomputer systems vendor reported a \$6.9 million loss, or 34 cents per share, including a write-off of \$4.1 million and a 35% decline in revenues from the year-earlier quarter.

During the fourth quarter, according to Wicat Chairman Dustin H. Heuston, revenues were ahead of the second and third quarters of 1984, and the operating loss (excluding the write-off) was not as great in the fourth quarter.

The company took a charge

against earnings to cover inventory and bad debts, prompted by a sharp second-quarter decline in orders for Wicat's computer-aided education and training systems, according to Heuston.

For the year, the company reported revenues of \$23.2 million, compared with 1983 revenues of \$25.3 million. The \$13.4 million loss for the year compared with a 1983 loss of \$4.1 million, or 27 cents per share. For the fourth quarter, the company reported revenues of \$5.9 million, compared with year-earlier revenues of \$9.1 million; the \$6.9 million loss for the quarter compared with a year-earlier profit of \$621,000, or 4 cents per share.

C. Itoh plans direct sales

WALTHAM, Mass. — C. Itoh Digital Products, Inc., a recently formed subsidiary of C. Itoh & Co. Ltd. of Japan, has announced that C. Itoh printers, which are distributed by Leading Edge Products, Inc., will now be marketed directly to dealers and retail markets.

A distribution contract between C. Itoh and Leading Edge was due to expire in June 1985. Under the new joint agreement, C. Itoh will expand its direct marketing program to the approximately 4,000 dealers previously served by Leading Edge, according to C. Itoh.

A marketing staff of 30 from Leading Edge will work for C. Itoh out of its Norwood, Mass., office, the company said.

Afips expo ship to sail to Asia early next year

RESTON, Va. — The boat *World Wide Expo* is scheduled to sail to six cities in the Far East as part of the American Federation of Information Processing Societies, Inc.'s (Afips) first international conference, Afips-Asia '85, scheduled for Feb. 14-March 2, 1985.

The expo plans to visit Tokyo, Osaka and Kitakyushu, Japan; Taipei, Taiwan; Hong Kong and Singapore.

The ship features two exhibition halls that reportedly can accommodate 100 exhibitors in an area of 3,000 square meters. Afips plans to schedule a number of seminars at the conference.

"Japan, Taiwan, Hong Kong and Singapore are committed to high technology," said Dr. Stephen S. Yau, vice-president of Afips. "According to the U.S. Department of Commerce, these markets will expand to more than \$14 billion in the next five years."

More information is available from Afips at 1899 Preston White Drive, Reston, Va. 22091.

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COMPUTER INDUSTRY



EXECUTIVE CORNER

■ **Paul Gasparro** has been appointed president and chief operating officer at Voicetek Corp.

■ **Kim Maxwell** has been named president of Racal-Vadic, Inc.

■ **Lavelle R. Gibson** has resigned as president and chief executive officer at California Devices, Inc. for personal reasons. Board member Jim Riley will be acting as chief executive officer until a replacement is chosen.

■ **Lawrence G. Finch** has been appointed president and chief executive officer of Paradise Systems, Inc.

■ **Steven C. Walker** has been named president and chief operating officer at Emcom Corp.

■ **V. Peter Haug** has been named president of Mirror Images Business Systems, Inc.

■ **James M. Bridges** has been appointed president of System Development Corp.'s services group.

■ **Richard T. Gralton** has joined Columbia Data Products, Inc. as president and chief operating officer.

■ **Steven R. Nelson** has joined Wayne Green Enterprises, Inc., of Peterborough, N.H., as executive vice-president and general manager of its newly formed Evergreen Software subsidiary, which will publish computer software for personal, business and educational applications.

■ Wayne Green Enterprises is a subsidiary of the International Data Group (IDG) of Framingham, Mass. Other IDG subsidiaries include CW Communications, Inc., publisher of *Computerworld*, and the International Data Corp.

■ **Phyllis S. Swersky** has been elected senior vice-president, finance, of Cullinet Software, Inc.

■ **Cliff Goetting** has been appointed to senior vice-president of operations at Atasi Corp.

■ **George Saterson** has been appointed to senior vice-president and chief operating officer of Charlton Associates, Inc.

■ **Thomas Kehl** has been named executive vice-president and chief operating officer of VG Systems, Inc.

■ **Frank White** has accepted the position of vice-president of manufacturing at Valid Logic Systems, Inc.

■ **John V. Harker** has been appointed executive vice-president of Genicom Corp.

■ **Kenneth R. Fannin**, vice-president of Tandon Corp., has resigned to pursue personal, non-business-related interests.

■ Scientific Atlanta, Inc. has appointed the following to vice-president and group executive: **Samuel D. Davis**, instrumentation and **James A. Hart Jr.**, broadband communications.

■ **Doris D. Bencsik**, formerly vice-president, engineering, was appointed to the new position of vice-president, operations, and will be responsible for Datapoint Corp.'s manufacturing, engineering, quality and program management functions. She will report to Edward P. Gistaro, Datapoint president and chief operating officer.

■ **David C. Drechsel** has been appointed to vice-president of Telephony Sales at Computer Consoles, Inc.

■ **Martin J. Chizzick** has been appointed to corporate vice-president of corporate program management, and **Mornay R. Mahoney** to vice-president of international operations at Storage Technology Corp.

■ **Gilbert H. Hoxie** has resigned as chairman and chief executive officer at Context Management Systems.

■ **Wayne A. Babich** has been named director of software development at Interactive Images, Inc.

■ **Franc R. J. De Weeger** has been appointed president of ASM America, Inc.

■ **Jack Bowen** has been appointed president of Cellular Business Systems, Inc.

■ **F. Javed Chaudhary** has been appointed to senior vice-president, chief operations officer at Summagraphics Corp.

■ The following promotions have been announced by CBS Software: **Marylyn Rosenblum**, vice-president, product development; **Robert Lovler**, vice-president, operations; **Barry Denes**, vice-president, sales; and **John Rosen**, vice-president, marketing.

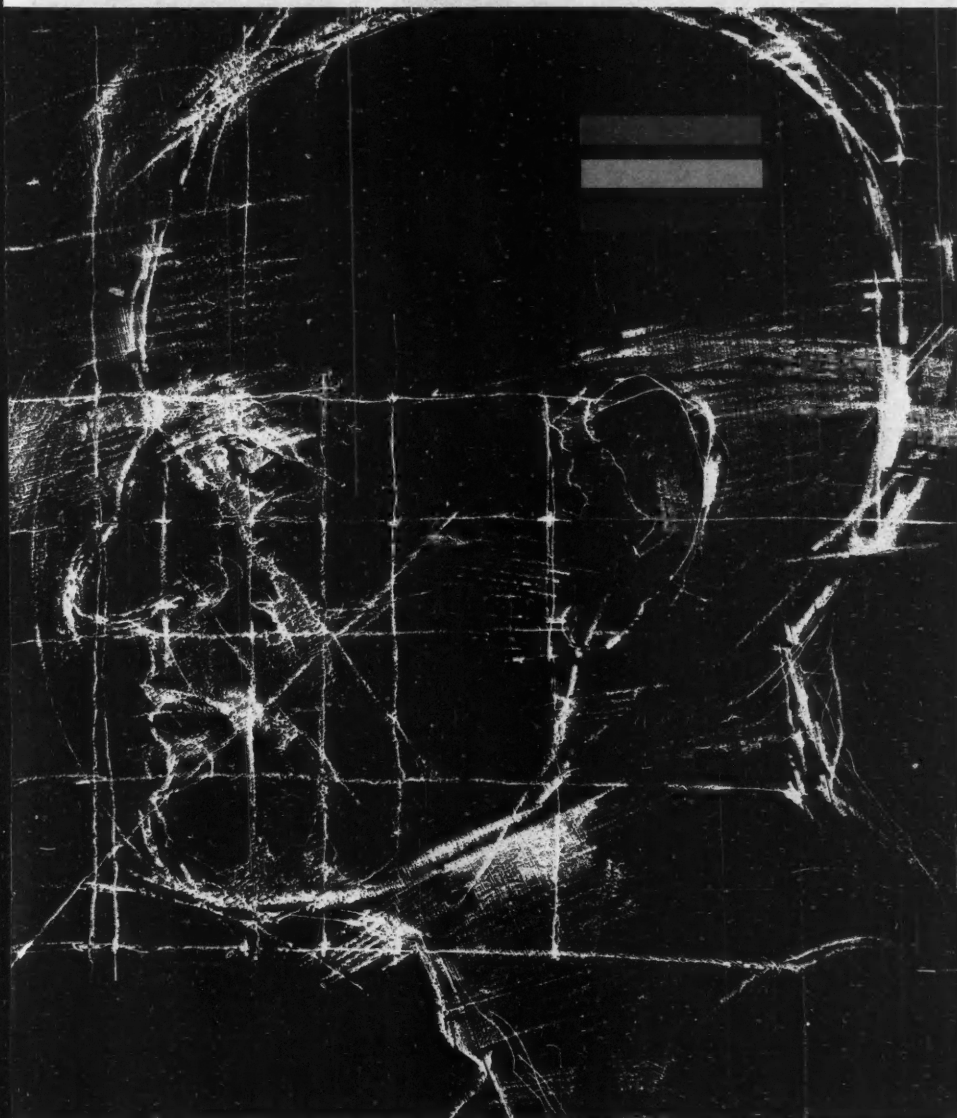
■ The following promotions have been announced by Avatar Technologies, Inc.: **Dr. Frederik D. Wiersma**, vice-president, planning and marketing; **Paul J. Rusconi**, vice-president, finance; and **Michael S. Kudla**, director of manufacturing.

■ Advanced Electronics Design, Inc. announces the appointments of **Agostino Burzio**, vice-president, engineering, and **Edward W. Unkart**, vice-president, finance.

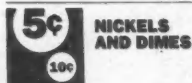
■ **George Cmela** has been appointed vice-president, international operations at Columbia Data Products.

■ **Leroy W. Beers** has been elected vice-president, technical staff, and **George R. Gazerwitz**, vice-president, operations staff, at Burroughs Corp.

software that links



COMPUTER INDUSTRY



Equesne Systems, Inc. reported revenues for its fiscal quarter ended March 31 of \$1.8 million, compared with \$1.1 million one year earlier. Profits were \$353,853, or 18 cents per share, compared with \$174,514, or 11 cents per share, last year.

Equitec Leasing Co., Oakland, Calif., announced the closing of a venture lease with **Disc Technology Corp.,** Billerica, Mass. The \$2 million line of credit was concluded under Equitec's venture leasing program.

Sterling Software, Inc. announced revenues in the second quar-

ter of fiscal 1984 rose 269% to \$4.9 million, compared with \$1.3 million last year. Profits for the three months ended March 31 increased 148% to \$340,000, or 8 cents per share, compared with \$137,000, or 7 cents per share, for the same period last year.

Recognition Equipment, Inc. reported profits for the quarter ended April 30 of \$1.9 million, or 25 cents per share, compared with \$6.6 million, or \$1.05 per share, for the same period last year. Revenues were \$33.2 million, compared with \$29.6 million for the previous year.

The Ultimate Corp. announced profits for the fiscal year ended April 30 were \$10.1 million, or \$1.04 per share, compared with \$4.6 million, or 50 cents per share, for the same peri-

od last year. Revenues were \$70.7 million, compared with \$39.2 million for the previous year.

For the fourth quarter ended April 30, profits were \$3.3 million, or 34 cents per share, compared with \$1.4 million, or 15 cents per share, for the previous year.

Icot Corp. reported a net loss for the third quarter of fiscal 1984 of \$570,000, compared with a net loss of \$1.9 million for the same period a year earlier. Revenues were \$5.1 million, compared with \$3.4 million for the previous year.

Quantum Corp. announced revenues for the fiscal year ended March 31 were \$10.6 million, a 61% increase over \$41.7 million for the previous year. Profits were \$10.6 million, or \$1.12 per share, compared with \$7.8

million, or 96 cents per share, one year earlier.

In the fourth quarter ended March 31, revenues were \$21.9 million, an 85% increase over last year's \$11.8 million. Profits were \$3.2 million, or 34 cents per share, compared with \$2.2 million, or 24 cents per share, in the previous year.

Eagle Computer, Inc. announced a net loss for the third quarter ended March 31 of \$9.8 million, or 67 cents per share, compared with profits of \$767,000, or six cents per share, for the previous year.

Revenues for the quarter were \$10 million, virtually identical to the same period in 1983.

Sanders Associates, Inc. reported revenues for third quarter ended April 27 increased 25% to \$192 million, compared with \$153.3 million a year ago. Profits from continuing operations rose 25% to \$13.7 million, compared with \$10.9 million last year.

AM International, Inc. reported a 34% improvement in profits for the three months ended April 28 of \$5 million, including an extraordinary item of \$2.1 million. Profits for the quarter were \$5.1 million, or 49 cents per share, compared with \$3.2 million, or 31 cents per share, one year ago. Revenues were \$153.7 million, compared with \$142.3 million one year earlier. The company has been operating under Chapter 11 of the Federal Bankruptcy Act and recently filed a reorganization plan.

Western Micro Technology, Inc. reported profits for the fourth quarter increased 279%, reaching \$648,000, or 26 cents per share, compared with \$171,000, or 12 cents per share, one year earlier. Revenues were \$13.4 million, compared with \$4.8 million one year ago.

Magnetic Controls Co. announced that although revenues increased by 14% during the second quarter of fiscal 1984 to \$20.5 million from \$17.9 million one year ago, profits from continuing operations declined 43% to \$724,000, or 13 cents per share, from \$1.2 million, or 22 cents per share in the same quarter of 1983.

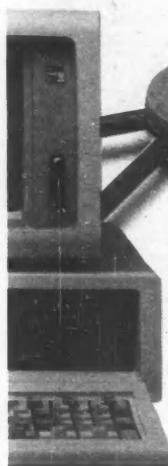
MSI Data Corp. reported a 19% increase in profits for the fiscal year ended March 31 to \$4 million, or \$1.63 per share, compared with \$3.4 million, or \$1.38 per share, in the prior year. Revenue totaled \$61.1 million, compared with \$58.6 million one year ago.

For the fourth quarter ended March 31, profits were \$884,000, or 35 cents per share, vs. \$142,000, or five cents per share, in the previous year.

Bolt Beranek and Newman, Inc. announced completion of the sale of the units of a \$3.2 million R&D limited partnership. Proceeds will be used to develop an expert-system-based software package called RS/expert.

Wallace Computer Services reported profits for the third quarter ended April 30 of \$5.3 million, or 55 cents per share, compared with \$4.5 million, or 47 cents per share, one year ago. Revenues were \$64.5 million, 18% higher than the comparable period for fiscal 1983.

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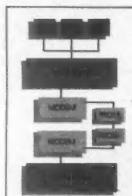
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Suppose something goes wrong with the unit?

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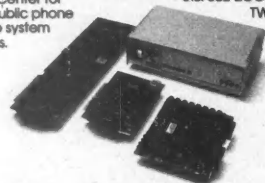
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COMPUTER INDUSTRY

VLSI from page 86

be used in the units. Another feather in the firm's cap is its approval as an IBM value-added re-marketer for the units — an important service selling point. The company has venture capital backing from private investors and has secured a major line of credit from Bank of America.

Universal Semiconductor is an integrated-circuit manufacturer which also offers an IBM Personal Computer XT-based personal CAE workstation and access to a mainframe-based design service. This company claims to be able to simulate, verify, fabricate, test and deliver a prototype custom microchip in four to eight weeks from receipt of an end-user's input into the personal CAE workstation.

Cademic is another personal CAE workstation, design and fabrication

services supplier. This company claims that its system is so easy to use that any engineer who understands digital logic will be able to create custom-integrated circuits after only a week of training.

Chancellor Computer also has an IBM Personal Computer-based CAE workstation with networking capability and plans to sell 20,000 units during the next five years.

Personal CAD Systems, CAD/Internet, Paragon Technology Corp. and Peritek Corp. are some of the other newcomers that also use IBM Personal Computers. As time progresses, there should be a mad scramble among microchip manufacturers to offer their custom-design services directly to the electronic engineers, which should provide a tremendous impetus to the personal CAE workstation market for some time to come.

LAW from page 90

a level of expertise far beyond that of their customers; and, like a doctor's patients and a lawyer's clients, computer users must often accept their vendor's judgment on faith alone. Hence, conclude advocates of this theory, vendors should likewise be subject to malpractice liability.

Other proposals include strict liability — liability for computer system malfunction without evidence of any wrongdoing on the part of the computer vendor — and the application to computer vendors of the Magnuson-Moss Warranty Act.

So far, these new theories of liability are merely proposals. But the courts are beginning to take notice of computer users' vulnerability.

Next week: Standardized contract clauses.

MSA-ADR from page 85

structure for the ADR/Datacom/DB versions of MSA's products. MSA's applications also operate with data base systems offered by other vendors, including IBM, Cullinet Software, Inc. and Cincom Systems, Inc.

According to ADR President Martin Goetz, another facet of the agreement provides for the two companies to market their software systems jointly in appropriate situations. Goetz explained that such situations would involve prospective customers looking to acquire full use of ADR/Datacom/DB, or what he described as a "complete data base and applications solution."

Under that arrangement, each company will market its own products, and customers will receive support and education from cross-trained MSA and ADR technicians.

Vohs said the ADR-MSA agreement calls for the companies to share information about their respective user communities — a move clearly intended to give each firm the opportunity to sell its products within the other's existing market base. MSA and ADR will also conduct joint seminars, public relations and advertising campaigns designed to promote the combined data base/applications system.

According to Vohs, the joint marketing agreement has been in force informally for nearly two years, but was not finalized until shortly before the announcement here June 12. MSA reportedly began developing applications for ADR's system software environment some 18 months ago.

ASL from page 85

stand what ASL was doing and didn't see the benefit being accrued."

Users and clients of ASL have differing opinions on the decision to disband the group. Roy Berglund, senior systems analyst for Phillip Morris, Inc., said, "I think Wang made quite a mistake by cutting away that segment."

Kavin Moody, director of systems planning and research for the Gillette Co. in Boston, is a member of the New England Office Automation Association, which was associated with Wang's ASL. Moody said the noncommercial nature of the ASL staff may have presented a dilemma for management.

Liam Clifford is information systems manager for the Irish Export Board (IEB) of Dublin, an independent government agency that promotes Irish exports. The IEB was asked to hear an ASL seminar on planning OA expansion. "We found it useful to have totally independent people with different approaches come in here and blow our minds open," Clifford said. "But their involvement made zero difference in the type of equipment we were going to buy."

Miller gave two reasons for the decision to divide ASL's functions between product development and marketing. First, he said, ASL was involved in both product design and development, but was not a part of either group. Secondly, the name "Advanced Systems Lab" implied that ASL was dealing with advanced systems, but Miller said the group was not marketing all of Wang's systems, such as the VS computer system.

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COMPUTER INDUSTRY



MERGERS AND ACQUISITIONS

Dysan Corp. signed an agreement to invest \$1 million in **National Information Systems, Inc.**, Cupertino, Calif., for an undisclosed amount of stock. The investment will be used for the conversion of Accent R, National Information Systems' fourth-generation language and relational data base management system, from the Decsystem-10 and 20 to the VAX. Release of the VAX version is expected in late 1984.

Marine Management Systems, Inc., Stamford, Conn., announced capital investment by two London-based firms. **United Newspapers, Inc.** and clients of **Montagu Investment Management**

Ltd. have taken an equity position in **Marine Management Systems**. Details of the transactions are not available.

Esprit Systems, Inc., Melville, N.Y., announced that it has signed a letter of intent with **Digilog, Inc.** and **DBS International, Inc.**, to purchase **DBS International (DBSI)**. Esprit will purchase all of the outstanding stock of **DBSI** for 250,000 shares of Esprit's common stock, to be issued at the transaction's closing, plus up to an additional 250,000 shares, to be issued by March 31, 1985, contingent on the level of sales of **DBSI** for the six-month period ending February 28, 1985, and the market price of Esprit's common stock on February 28, 1985.

The acquisition is subject to the completion by Esprit of a satisfactory review of the business of **DBSI**, final approval by the boards of Di-

gilog and Esprit and execution of definitive agreements.

American Teleprocessing Corp., Houston, acquired **Stockwatch** of Houston, which will operate as a wholly owned subsidiary.

Stockwatch, established in January 1980, transmits real-time quotes from the New York Stock Exchange, American Stock Exchange, National Association of Securities Dealers Automated Quotations, Chicago Mercantile Exchange, Chicago Board of Trade, New York Commodity Exchange Center and Kansas City Board of Trade directly to microcomputers placed in client's offices or homes.

Rand Information Systems, Inc., San Francisco, announced it has acquired all the outstanding stock of **Conversions, Inc.**, Raleigh, N.C.,

in a combination cash and Rand common stock transaction.

The total purchase price to be paid is based substantially on the future performance of the acquired company. Conversions will operate as a wholly owned subsidiary of Rand.

Analog Devices, Inc., Norwood, Mass., announced that an investor group led by the company's venture capital

division, **Analog Devices Enterprises**, invested \$4 million in **Bipolar Integrated Technology, Inc.** of Beaverton, Ore. **Analog Devices** invested \$2.3 million, for which it received equity securities, giving the company a minority position in **Bipolar Integrated Technology**.

Joining **Analog Devices** were **First Interstate Capital, Inc.**, **First Capital Corp.** and **Adventures Limited Partnership**.

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BIG 8 from page 85

tion services business is with nonaudit clients, but conceded, "I don't think [the dispute] will be completely resolved."

But, he countered, "If you look at the public accounting profession, it is one of the most heavily regulated professions there are." Firms engaged in auditing practices are scrutinized by the Securities and Exchange Commission and by congressional committees and carry out severe self-regulation, he noted, adding, "We're continuously being put under the microscope."

While public accounting firms often are subject to litigation, "to the extent of our knowledge and anybody else's, we don't know of a single instance where the issue of conflict of interest has been raised," he claimed.

Hugh W. Ryan, assistant director of data management for the firm, said that within the firm, "there is a tendency to separate the services; when an auditor looks at a system, it is not an Arthur Andersen system, it's just another client."

The firm's revenues from consulting and installation services are rapidly approaching \$400 million annually, Levitan said, pointing out that the firm has been engaged in management consultation since its inception. Arthur Andersen claims to have initiated data processing consulting in 1952, when it helped General Electric Co. implement a payroll system on a Univac I computer.

The name Arthur Andersen may not be synonymous with DP, but the firm plans "very aggressive marketing" efforts to change that, according to Levitan. "Many in the business community don't know what we do or the extent of what we do," he

said. With 6,000 professionals engaged in the practice on a worldwide scale, the firm believes it is in a unique position and has unique skills to offer in providing information services, he added. In a 1983 report to employees, the firm said it derived 27% of its revenues, or \$328.9 million, from management information consulting.

A key to its efforts will be the reputation of the company, Levitan said. "Our best approach is through our reputation," he said, adding that the company takes full re-

sponsibility for its employees, who are mainly recruited straight out of college and undergo rigorous training.

Levitan said the firm sees three major areas to which it will direct its efforts: information for competitive advantage; reducing applications backlog through a systems approach to systems development; and integration of technologies developed for the office, DP, MIS and the factory. Levitan said the firm's goal is to bring together technologies "from robots to financial systems."

David

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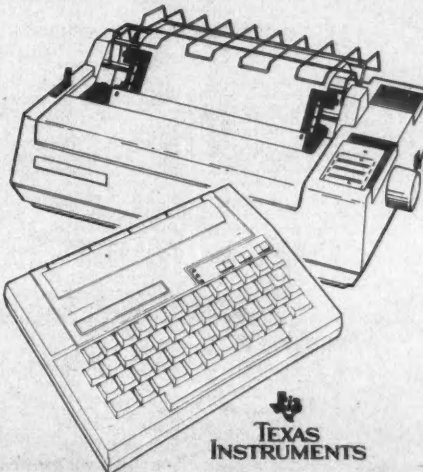
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If you are unable to call, please forward your resume in confidence to: Mr. Joe Preston, Director National Sales Recruiting, Harris Corporation, Information Terminals Group, 18001 Dallas Parkway, P.O. Box 809022, Dallas, Texas 75380-9022

BALTIMORE, PHILADELPHIA, WASHINGTON D.C.
(Federal and Commercial)
CALL COLLECT (703) 448-5400:
Mr. George Bernardini, District Manager

NEW YORK CITY, NORTHERN NEW JERSEY
CALL COLLECT (201) 994-2020:
Mr. Anthony Fusarelli, District Manager

CHICAGO, DETROIT, KANSAS CITY, MINNEAPOLIS and ST. LOUIS
CALL 1-800-245-0248:
Mr. Wayne St. Clair, Regional Director

DENVER, SAN FRANCISCO, LOS ANGELES, PHOENIX, PORTLAND and SEATTLE
CALL COLLECT (303) 799-8600:
Mr. Doug Wahl, District Manager

ATLANTA, DALLAS and HOUSTON
CALL COLLECT (214) 248-3265:
Mr. Van Adamson, Regional Director

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HARRIS

IF IT'S HAPPENING IN INFORMATION TECHNOLOGY,
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IBM SYSTEM/38 PROGRAMMER ANALYSTS

Want to live in the beautiful mile-hi city of Denver, a fast growing high tech capital? If you qualify as an IBM System Analyst, we would like to hear from you.

First Trust Corporation, one of the nation's largest retirement plan trustees, is seeking two experienced S/38 programmers/analysts. We offer a challenging and profitable career opportunity to those seeking a unique niche in the burgeoning retirement plan industry.

We require a candidate to have at least one year's experience on the S/38, a stable work history and a team approach as well as very strong oral and written communication skills for multi-departmental interface.

If you have the required credentials, and are enthusiastic about learning new functions, contact First Trust. We offer a competitive starting salary based on experience, and a complete benefit package.

To match your needs with those of an established corporation with an outstanding growth history, send your resume to:

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444 Sherman Street
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Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Everyday new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Reichle, CPC, Data Processing Specialist.

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DATA PROCESSING

Supervisor of Applications Programming

Sundstrand Heat Transfer, a major producer of heat transfer products, has an opportunity for an individual to join a progressive company working with state-of-the-art hardware systems.

The person we are seeking will become involved with implementing a comprehensive manufacturing system (COPICS) as well as integrating it with all other automated systems.

It is important that this person be experienced in CICS, TSO, and COBOL, as well as with manufacturing process systems. This position would provide the ideal opportunity for a systems analyst or project leader who is interested in professional growth.

This Sundstrand facility is located in a resort area of southwestern Michigan, and would appeal to those enjoying outdoor recreational activities and a relaxed lifestyle. However, the area is near several large cities which provide cultural opportunities.

As a diversified industry leader, Sundstrand offers challenging career opportunities, and an outstanding compensation and benefits package which includes housing assistance and relocation.

Interested candidates should send their resume and salary requirements to:

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Sundstrand Heat Transfer, Inc.
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"Sold On Cincom."

British born Steve Rudlin, like many Cincomers, is truly an international software salesperson. His career with Cincom Systems has taken him to Australia, New Zealand, and the United States. Steve is currently Manager of Cincom's Eastern U.S. Region. From a recent interview, here are Steve's thoughts on Cincom's approach to software sales and what he looks for in recruiting software salespeople.

Important Software Selling Traits:

"Three of the most important traits I look for in sales candidates are perception, integrity, and determination. Perception gives a salesperson the ability to understand what the customer's needs are and which software can most effectively solve those needs. Integrity is important because it's at the very heart of everything Cincom holds dear. And thirdly, I think every good salesperson should be very determined."

Cincom's Commitment To R&D:

"We've found that the best thing we can do for our sales force and our clients is to provide leading edge products, backed by the best support possible. That's why Cincom is so devoted to Research & Development. Nearly 22% of our total annual revenues go to net new R&D. That's not maintenance of older products—but creation of new. The result of our R&D concentration has been products like MANTIS[®], our application development language, which has taken the industry by storm. Products like TIS[®],

ULTRA INTERACTIVE DATA BASE SYSTEM[™], MRPS, and our new MANAGE USER SERIES[™] are also gaining an international reputation as some of the best software systems of their kind."

Selling For A Full Service Vendor:

"Along with R&D every Cincom salesperson is backed up by a comprehensive software support commitment. Cincom salespeople can, with confidence, guarantee things like support, service and user education and never worry about the commitment of the people and the company behind these promises. In essence, working with Cincom makes it easier to become a successful salesperson. And if you are already successful, Cincom can help you become even more successful."

Outstanding Rewards For Outstanding Performance:

"Cincom has no ceiling on the income our sales people can earn. We ask a lot—and we provide a lot. So, when an individual performs in an outstanding manner they are rewarded very well. The success factor among Cincom salespeople is very high. They are motivated and their contributions are well appreciated."

On Software Excellence:

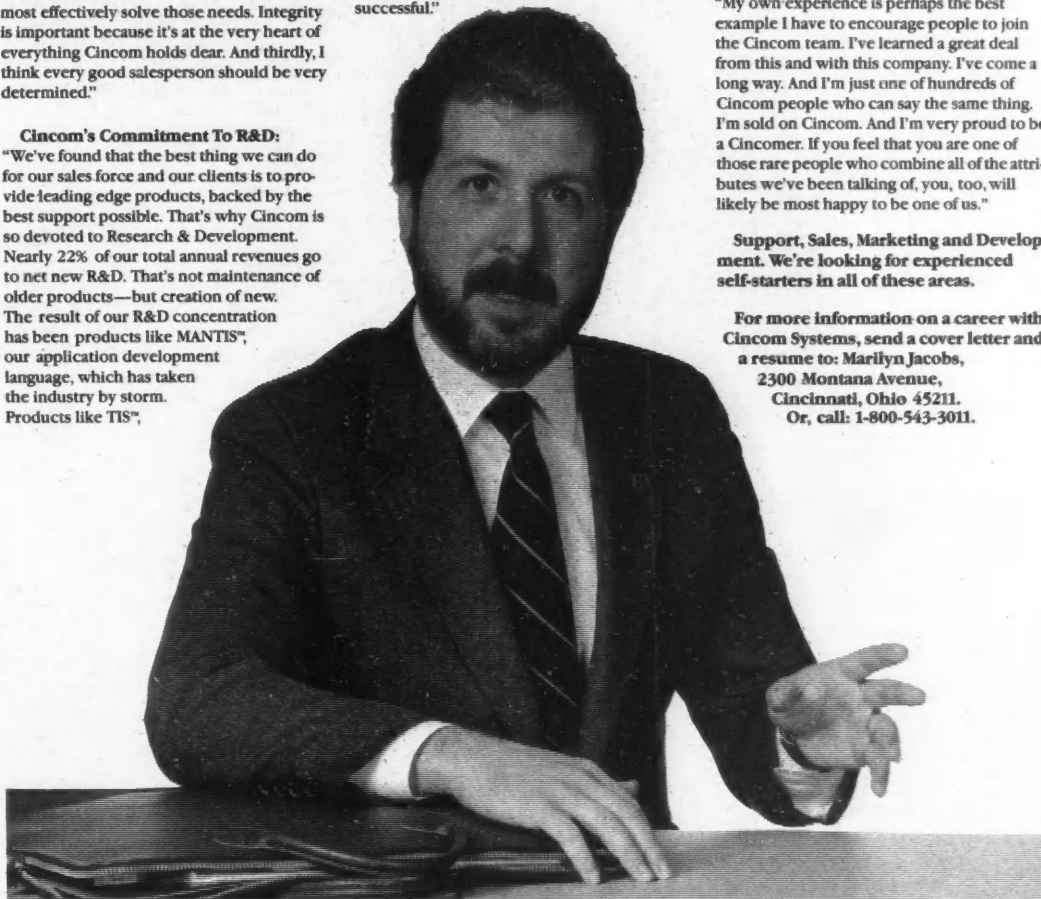
"Software is a people product. The better one's people, the better one's software. This is why we go to such great lengths to find the most talented and the most achievement-oriented people available."

On Working With Cincom:

"My own experience is perhaps the best example I have to encourage people to join the Cincom team. I've learned a great deal from this and with this company. I've come a long way. And I'm just one of hundreds of Cincom people who can say the same thing. I'm sold on Cincom. And I'm very proud to be a Cincomer. If you feel that you are one of those rare people who combine all of the attributes we've been talking of, you, too, will likely be most happy to be one of us."

Support, Sales, Marketing and Development. We're looking for experienced self-starters in all of these areas.

For more information on a career with Cincom Systems, send a cover letter and a resume to: Marilyn Jacobs, 2300 Montana Avenue, Cincinnati, Ohio 45211. Or, call: 1-800-543-3011.



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We know your time is important. Now, you can learn about career opportunities at Dynamic Control without leaving your home. Our technical managers will be available after hours to talk with you about your talents and how you might become a part of our organization. We are a division of a Fortune 500 NYSE Company and have become one of the nation's leaders in developing software systems for the healthcare industry. We currently have positions available in Orlando, Florida; Bethesda, Maryland and Chicago.

PROGRAMMERS/PROGRAMMER ANALYSTS

IBM System 38

ORLANDO • BETHESDA • CHICAGO

We are seeking programmers experienced in coding RPG II on System/38, System 34 or RPG III on System/38 in an interactive on-line environment or individuals with experience in CADOL on CADO Systems. Two-three years programming experience required.

Market recognition has greatly increased our volume and our need for experienced systems professionals. We are actively recruiting for our Pharmacy, Development, Implementations and Customer Support areas.

SYSTEM/38 PROGRAMMERS

BETHESDA

The individuals selected will be based in our Bethesda location and will have the opportunity to travel to client sites throughout the nation. Good communication skills, a minimum of two years of S/34 and/or S/38 programming experience in an interactive environment will qualify you to join our elite team of S/38 professionals.

SYSTEM/38 PROGRAMMER ANALYSTS

CHICAGO

We are currently seeking experienced Programmer/Analysts to join the staff in our Chicago location. Responsibilities will include design, modification and installation of RPG III code in a healthcare environment on the IBM S/38 and will ultimately involve managerial responsibilities within the Chicago area. A minimum of 4-5 years RPG II on S/34 and/or 2+ years RPG III on S/38 in an interactive on-line environment is required. Hospital experience desirable.

Dynamic Control is a people-intensive organization. In accordance, we offer an excellent salary, complete benefits including medical, dental, profit sharing, the opportunity for national and international travel, liberal vacation time and RELocation ASSISTANCE. To find out more about these career opportunities call our technical managers at the location you are interested in: **Orlando - 1-800-357-5353; Bethesda call collect 301-951-1270; and Chicago call John Miller collect at 312-480-5783.** If you are unable to call, write us an informal letter or submit a resume outlining your qualifications. Personnel Department, 5817 E. Sanlando Springs Drive, Longwood, FL 32750-5187.



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Bachelor's degree and 5-7 years experience including minimum 3 years in a management position related to the development and technical support of application systems in a DEC/VAX/VMS environment. This new position will report to the Vice President and will be responsible for all design, programming, support and technical support for a national center complex of 3 VAX systems as well as a field system planned for growth to over 100 locations.

Strong administrative and procedural skills a must to organize and effectively direct the 10 staff assigned to this area. Minimal travel. Salary to mid \$40's and paid relocation for the right candidate.

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Bachelor's degree in math or computer science and 2-4 years experience in programming business applications or some combination of education and experience; COBOL or Basic and DEC/VAX experience is required. Salary mid to high \$20's negotiable on the basis of qualifications and skills, and paid relocation.

Comprehensive and desirable benefits include medical/dental/life, tax shelters and health club. Direct resume to the Senior Employment Representative.

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COMPUTER PROFESSIONALS

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Foundation Computer System's ALLY™ project team has immediate openings for **senior systems developers** and for a **manager of software quality assurance**. And, our language development group has openings for **compiler developers**.

ALLY is a fourth-generation software development environment. It integrates an easy-to-use application development system with a powerful, window-oriented screen management system. ALLY is written in the C language, and runs on many operating and database management systems. Several major computer manufacturers have purchased ALLY licenses.

Foundation offers the best of two worlds: a fast-moving, small-company atmosphere, along with big-company benefits, rewards and security. Cary, NC is adjacent to the Research Triangle Park and three major universities. This area is rated among the best places to live in the United States.

Senior Systems Developers

We have openings for two skilled, senior-level systems developers. One developer will help us implement and enhance our ALLY products. You must have a strong background in systems programming using Unix™ and C. The other person will

be responsible for porting ALLY to the IBM mainframe environment. You must have experience with C, Unix, and VM/CMS.

Software Quality Assurance Manager

This is a unique opportunity to structure, staff, and manage your own software quality assurance group. You will use your strong background in quality assurance to establish the group's policies and procedures.

Compiler Developers

You will use your experience in all phases of compiler development to build compilers for a new computer system. The languages include C, COBOL, Pascal, FORTRAN, and BASIC.

To apply for one of these positions, send your resume to:

Foundation Computer Systems
875 Walnut Street
Cary, NC 27511

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ALLY is a trademark of Foundation Computer Systems
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Foundation

DIRECTOR OF COMPUTER SERVICES

\$30,402 - \$40,888

The City of Highland Park, Illinois, is accepting applications for a Director of Computer Services. The Director is the head of the Computer Services Department and reports to the City Manager. The city currently operates 3 minicomputer systems at 2 sites. Near term plans call for expanding to 57 terminals located throughout the city and the installation of an electronic cash register. A broadband local area network connecting 37 buildings, a relational database management system, and laser printer are in place. The successful applicant will have a minimum of a B.S. in computer science or closely related field (M.S. preferred) and 5 years of experience in developing business applications, at least 2 years of which will have been at the project leader level. Preference will be given to applicants with VAX/VMS experience, and/or Oracle DBMS experience. Interested persons should apply by July 13, 1984 to:

Personnel Office
City of Highland Park
1707 St. John Avenue
Highland Park, IL 60035
Phone: (312) 432-0800

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 Sys. Prog. TO: \$40,000
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 Sys. Anal. TO: \$37,000
 (3 plus yrs. ins. appl. & COBOL) TN location
 Prog. Anal. TO: \$28,000
 (3 yrs. H-P & COBOL) NC location

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DEPARTMENT OF MANAGEMENT STUDIES

AN ASSOCIATE-PROFESSORSHIP IN INFORMATION SYSTEMS

Applicants should have a strong record of teaching and research experience, with interests in two or more of the following fields: Systems Analysis, Systems Design, Programming, Data Base Management Systems, Data Communications, Management Information Systems, and Decision Support Systems. Preference will be given to those who are able to demonstrate practical experience in any of these areas. It is expected the person appointed will play a leading role in the development of teaching and research programmes in Information Systems and Commercial Data Processing.

A LECTURESHIP/SENIOR LECTURESHIP IN INFORMATION SYSTEMS

Applicants should have a higher degree and have teaching experience and research interests in two or more of the following fields: Systems Analysis, Systems Design, Programming, Data Base Management Systems, Data Communications, Management Information Systems, Decision Support Systems. Preference will be given to those who are able to demonstrate practical experience in any of these areas.

Compensating salaries will be established within the appropriate scale. Present salary scales are: for an Associate Professor \$N237,086 per annum; Senior Lecturer \$N227,086-\$30,127 per annum; and Lecturers \$N221,690-\$25,684 per annum. Salaries are currently supplemented by an \$8 per week cost-of-living allowance. Conditions of Appointment and Method of Application are available from the Assistant Registrar (Academic Appointments), University of Auckland, Private Bag, Auckland, New Zealand. Applications in accordance with the Method of Application should be forwarded as soon as possible but not later than 31 AUGUST 1984.

AMHERST COLLEGE NETWORK MANAGER

Amherst College is installing a broadband cable network for campus-wide data communications. The College invites applications and nominations for the new position of Network Manager. The Network Manager will be responsible for the day-to-day operation of the network. He/she must understand the basic theory of broadband cable communications and be competent to evaluate software for interfacing with the cable. Inasmuch as the Network Manager will be dealing with many people from throughout the College in the implementation of an unfamiliar technology, his/her technical knowledge and skills must be matched with patience and an ability to communicate clearly and easily.

Candidates should have a bachelor's degree in Computer Science or an equivalent background with relevant experience. Nominations and resumes should be sent to Professor Duane W. Bailey, Department of Mathematics, Amherst College, Amherst, Massachusetts 01002 before July 16, 1984. All inquiries will be acknowledged.

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A Better Approach For A Better Career

Here are some of the positions in high tech electronics and EDP that are currently available with our corporate clients.

Software Engineers Positions require a BSCS or EE and a minimum of 2 years experience. Real-time TF/TA software, PASCAL, C, ADA, Jovial and assembly language, Advanced Signal Processing, Parametric definition, time/memory tradeoffs and real-time codes, VAX running VMS procedure development, test systems and real-time communications software, design coding and test of real-time imbedded guidance systems, configuration management, array processors and other target microengines, systems programming including hardware description languages, resistor transfer languages and other CAD tools, development of VHSC hardware descriptor language.

VLSI IC Design Engineer Multi-chip VLSI design, bar mapping simulation, logic design, layout and photomasking. +5 yrs. exp. BSEE.

Circuit Design Engineer CMOS ICs including advanced CMOS gate arrays. +5 yrs. exp. BSEE.

Programmer Analysts Challenging applications in accounting, finance, distribution, inventory management - 2 years MICRO-DATA OR PICK OS experience with DB 6 a plus.

Programmers Variety of applications across all disciplines. Requires 2 years MACRO PDP11 and ASSEMBLER experience.

Digital Circuit Design Engineers Design, breadboard, and test advanced signal processors for radar, acoustic processing and MIL-SPEC applications. MSEE and four + years of experience.

Telecommunications Consultants Design and develop a telecommunications network to support the nationwide delivery of data processing and information services products. Five + years of experience in multi-phase telecommunication design and development. Knowledge of mini and micro computers desirable. Ability to consider business needs in multi design objectives. Marketing experience a +.

Systems Consultants - IBM SYS/34 Serve as Team Leader on multiple projects. Operations and product management in product definition and user requirements, research through implementation. Requirements: IBM SYS/34, RPG II, COBOL, CICS, DOS/VSE preferred.

Senior Technical Consultants Lead the design, development, testing and implementation of human resources, payroll and accounting products. Requirements: MICRO-DATA/PICK OS, HRIS, personnel, payroll, accounting applications a plus.

Electronics Engineers BS EE or CS, Systems design experience in Hardware, Firmware or Software, UNIX, C and ASSEMBLY are a +.

Senior Technical Consultants - TANDEM Heavy team environment in analyzing, designing and testing financial applications. Experience with: TANDEM/TAL, COBOL, SCOBOL, Financial Applications.

Systems/Technical Consultants Key resource in analyzing, developing and integrating user department systems. Experience with DEC VAX, 11/780, IBM 30XX, HP or similar minis, COBOL. User support experience a +.

Senior Systems/Technical Consultants Conduct research within operating departments and product management to identify needs, modifications, interfacing requirements - concept through implementation. Experience in business systems analysis, COBOL, ASSEMBLER, EASYTRIEVE.

Systems Analysts Requirements: COBOL, VSAM, TSO, JCL, ASSEMBLER and/or payroll experience a plus.

Computer Service Sales Initiate the introduction of new micro & mini based systems products and services. Requirements: 3 years commissioned sales experience in data processing systems/services or hardware; payroll, accounting, human resources product experience.

Customer Support Representatives - Computer Services Provide technical support to customers and marketing. Analyze customer hardware and software, develop alternatives, recommendations and solutions to unique situations. Requirements: one + years in data processing or equivalent education; experience with microcomputer-based solutions + technical service support. Applications background: payroll/personnel, marketing, accounting/finance.

CAD Engineering or System Design Software experience. FORTRAN, C, BSEE/MSEE or equal. 2 years industry experience. UNIX a +. VM/CMS plus UNIX in IBM, DEC environment. Database design. Knowledge of solid state devices, digital and analog IC's. BSEE or equal experience in ASSEMBLER, UNIX, C desired. Experience testing to wafer level microwave a plus.

Systems Manager VAX or equivalent. Mini operations experience. Provide direction to users. Build utilities and tools. BSCS or equivalent. VAX systems manager in UNIX environment. C and ASSEMBLY language code experience.

Senior Electronics Engineers Circuit design of computer based logic for tape and disk drive. 3 + years hardware logic design. 1 + years tape/disk experience.

Engineering Managers BSEE, 2 years management experience. Mainframe or minicomputer environment design experience.

Internal DP Consultants Minimum 3-5 years DP experience. Bachelor's degree and excellent communication/interpersonal skills are essential. Project management and software design experience desirable. Knowledge of any of the following areas highly desirable: COBOL, CICS, PL/I, FOCUS, and IMS.

Technical Programmer Support Network Control, activate and monitor on-line performance, circuit and equipment operation and supervise operators on a large network. Prefer 2 years experience operating a large network, knowledge of VTAM, CICS, 3705's, NCGE, NPDA and problem diagnosis/resolution. TSO and JCL a plus.

Technical Specialists Data base, data communications, telecommunications, minis, micros, systems software and application software technical skills required. Degree in Computer Science or Engineering and good interpersonal skills necessary.

Sr. Programmer Analyst Must have at least 3 years of BAL experience using IBM hardware in an OS environment. Heavy user contact.

Software Engineers Troubleshoot and debug on-line, batch and time-sharing problems. 2 + years real time systems programming experience. Telecommunications experience a +. BSEE or BSCS.

Candidates, Call Weekdays, 1-800-221-5635

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FIELD ENGINEERS

Dataserv Computer Maintenance is expanding nationwide. We have immediate openings now!

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Immediate opening for experienced Field Engineer to maintain IBM 3651 Controllers and IBM 3663 Grocery Scanner Systems.

Chicago, IL - Field Engineer.

Immediate opening for experienced Field Engineer for the support and maintenance of IBM large mainframe, 3033 CPU, terminals and all associated peripherals.

North Haven, CT - Field Engineer.

Immediate opening for experienced Field Engineer to service and maintain IBM 327X terminal equipment.

New Hope, MN - Banking Equipment CE needed. Immediate opening for a Customer Engineer with experience on IBM 3890's. 1419 experience is desired but not a must.

Dataserv will have additional opportunities soon for experienced field engineers and technical specialists in major cities throughout the United States. If you're considering a change, contact Dataserv for a review of our company and your career goals.

For immediate confidential consideration call TOLL FREE - 800-328-6729 or send resume to: Bev Walters, Dataserv Computer Maintenance, Inc., P.O. Box 3003, Hopkins, MN 55343.

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(Software Subsidiary)

M.B. Systems, Inc. is a newly formed subsidiary of the MILTON BRADLEY COMPANY, established to develop and market our own line of proprietary software products. Our small group has a ground floor opportunity for an executive to head-up all sales, marketing and business development activities for this start-up operation.

Reporting to the subsidiary President, you will have the prime sales responsibility and will personally present to top management of client companies. You will also be responsible for generating marketing plans, including advertising and promotional programs. In addition, you will need to have a thorough understanding of systems from main-frame to micro, and be capable of contributing to the creative process by identifying new product opportunities to be developed. A solid background in software sales and development is required.

If you feel well qualified for this exciting opportunity offering a highly competitive compensation arrangement and excellent benefits, please forward your resume (NO PHONE CALLS, PLEASE), including salary history to:

JAMES G. KERSHNER
Director, Employee Relations

MILTON BRADLEY CO.

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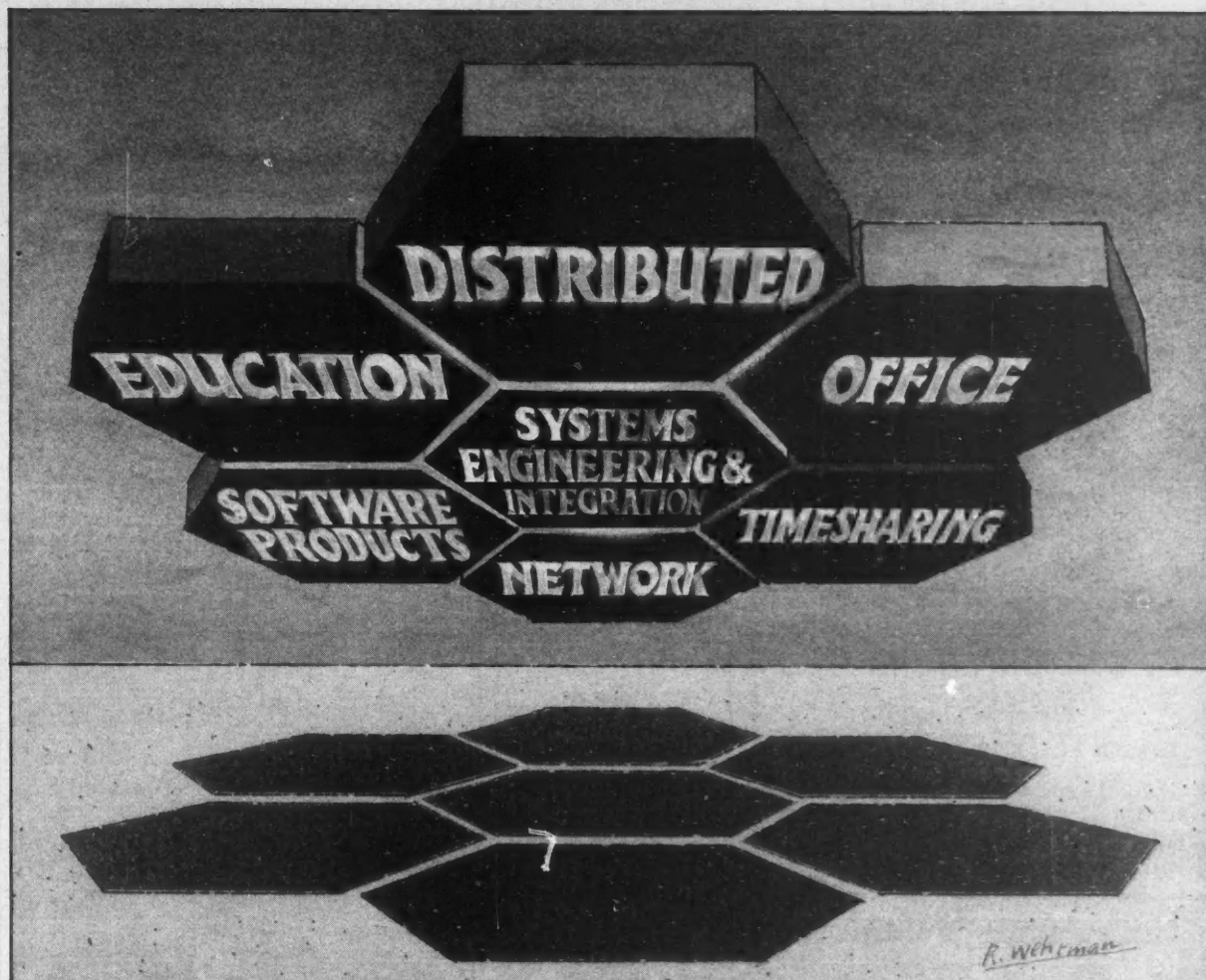
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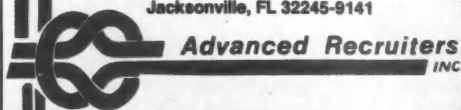
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Albany Savings Bank F.S.B.
P.O. Box 70
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Our Computer Programmer positions require a BS in Computer Science and/or 2 years DP experience or equivalent. Thorough knowledge of PL/I is essential. VSAM, CICS, MVS, SAS, or IBM Assembler Model 204 experience is highly desirable.

We offer excellent salaries and major company benefits including relocation assistance to our Dunedin, Florida location. Please send resume and salary history to:

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- Applications

DATA BASE

- Administrators
- Analysts

TECH SUPPORT

- Telecommunications
- Network Planning

2 years plus experience preferred in any of the following:

MVS, IMS, DBDC, IDMS, OS, CICS, TOTAL, PLI, COBOL, VSAM, VTAM, UNIX, 'C', COMTEN, FOCUS, CAD, GRAPHICS, X.25

For immediate professional and confidential consideration, please send resume to Wally Schmidt:

**PARSONS
CONSULTANTS INC.**

Turnbull Professional Center
706 Turnbull Ave., Suite 202
Altamonte Springs, FL 32701

**SYSTEMS PROGRAMMER
DOS/VSE & VM/370**

HARFORD COMMUNITY COLLEGE has an opening for an experienced Systems Programmer. The position reports to the Director of the College's computer center, but will be assigned, on a scheduled basis, to work one-half of the time at the Harford County Government computer center. The College is running an IBM 4341 with 3340/3350 disks and VM/370, DOS/VSE, CICS/VS, VOL/IE, UPO, SPSS, VSAM, BTAM, etc. County Government is running an IBM 4331 with 3340/3370 disks, using DOS/VSE, CICS/VS (Command Level COBOL), ICCF, VSAM, etc.

A Bachelor's Degree is required, and three years of experience in systems programming in a comparable environment is preferred.

Starting salary range is \$28,600 to \$33,100 (depending on education and experience), plus an excellent benefits package. The maximum salary on the pay scale is \$42,300. Starting date is August 8, 1984. For additional information, call Bob Slawson at (301) 836-4234.

To apply, send a letter of application and a resume of work experience and education to Edward Kuhl, Director of Personnel, Harford Community College, 401 Thomas Run Road, Bel Air, Maryland 21014 as soon as possible, but not later than July 9, 1984.

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**Assistant Director for
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SYRACUSE UNIVERSITY is searching for a highly motivated individual whose background combines technical expertise with mainframe computers and software, management of high-level technical staff, and excellent human relations skills.

The Assistant Director for Mainframe User Services reports to the Director of Academic Computing Services, and has these duties and responsibilities:

- Manage the activities of the Mainframe User Services group, which includes 10-15 senior technical staff members plus graduate and undergraduate student programmers and consultants. Academic Computing Services runs 3 IBM 4341's under VM/CMS and MVS and 1 DEC-10 under TOPS-10.
- Monitor and optimize total university needs for Mainframe User Services in the areas of word processing, statistics, and graphics packages and programming languages.
- Plan and coordinate the installation and maintenance of mainframe operating systems and all system software.
- Manage the Education and Consulting operations of Academic Computing Services.

Applicants should have earned at least a Master's degree in a computer-related field and have 6 years of technical experience with computers of which at least 2 years should include supervising high-level technical personnel. An additional 5 years of technical experience plus a Bachelor's degree in a computer-related field can substitute for a Master's degree. Extensive working knowledge of mainframe operating systems and software is essential. Experience in managing a group of computer professionals is required. Ability to interact effectively with faculty and students in all areas of study is important. Starting salary is negotiable. Position begins September 1, 1984.

Syracuse University is a major private research university located in central New York with 15,000 undergraduate and graduate students, 1000 faculty and 3000 staff, of which about 7000 are computer users. Syracuse University's benefits include competitive salaries, advanced degree opportunities, dependent scholarships, and generous vacation and retirement plans. Send resume before July 16, 1984 to: Syracuse University Personnel Department, Skytop Office, Syracuse, NY 13210.

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Requires 3 or more years VAX/VMS experience, plus demonstrated strong system programming experience using MACRO, BASIC and DCL.

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Requires 2 or more years of system experience. Applications in high level languages preferred. VMS experience a definite plus.

VAX INFORMATION ARCHITECTURE

Requires 18 months experience in software services or applications design and programming, data base design, implementation and maintenance and/or forms management utilization. In-depth knowledge of VAX Information Architecture products such as DTR32, DBMS, and FMS is preferred.

DECnet

Requires 2 or more years experience working with DECnet applications, VAX, RSX, or RSTS systems and a solid knowledge of communications protocols.

TOPS-20/TOPS-10

Requires 2 or more years of operating system support experience with DECSYSTEM-20s, DECSYSTEM-10s or other large timesharing systems exposure. Applications experience in several high level languages is preferred.

UNIX*

Requires 2 or more years experience using UNIX operating system and "C", preferably Berkeley UNIX, and its associated tools. *UNIX is a trademark of AT&T Bell Laboratories.

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Requires 2 or more years system experience on one or more Digital operating systems and a basic knowledge of Digital hardware configurations.

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As part of our Remote Support Staff, you would utilize complex test equipment, operating software, customer site historical data, diagnostic manipulation, configuration rules and other resources to identify and resolve system or device problems.

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This is a challenging opportunity for an exceptional person to set future direction in data base for worldwide operations. You will be involved with users in a consulting capacity to NSC internal development groups. To qualify, you should have a BS/BA, or equivalent and at least 10 years' experience in an MIS related position. A strong knowledge of Cullinet's IDMS and IDD, as well as experience in an OS/MVS and IBM PCM environment are required. Experience in conceptual modeling an advantage.

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You will be working with a group of data base consultants in a fast-paced, team environment with state-of-the-art hardware and software. Your key objective is to make a major contribution to system development productivity. IDMS/R is a definite plan in our future growth. Ideal candidate will have a working knowledge of IDMS and related Cullinet products, including experience in an OS/MVS and IBM PCM environment.

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You will enjoy top competitive salary and generous company benefits designed to match your current and projected skill level while working in a professional career-oriented environment. For immediate and confidential consideration, send your resume with salary requirements to: **Employment Manager, GOULD DEFENSE SYSTEMS, INC.,** Ocean Systems Division, Dept. HR-408, 18901 Euclid Avenue, Cleveland, Ohio 44117. No Third Party Inquiries Please. U.S. Citizenship is required. An Equal Opportunity Employer, M/F/H.

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- On line (CICS) applications knowledge
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| Syst Prog OS | Virginia | To \$45K |
| P/A CICS/COBOL | Maryland | To \$35K |
| P/A BAL | Virginia | To \$28K |
| P/A IDMS/COBOL | Maryland | To \$35K |
| P/A CICS/BAL | Carolina | To \$32K |
| Prog COBOL | Maryland | To \$28K |
| DBA IDMS | Carolina | To \$42K |
| P/A CICS/COBOL | Washington | To \$28K |

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Fortune

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Virginia Beach, VA 23452

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The Information Systems Department of First National Bank in Albuquerque has excellent opportunities for Programmer/Analyst and a Sr. Systems Programmer.

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Senior Systems Programmer

The Senior Systems Programmer will be responsible for the development and maintenance of our teleprocessing network. Our TP network is ACF/VTAM based under MVS/JES2 on two 4341-2 computers. We are seeking professionals with a minimum of 3 years experience in development and maintenance of ACF/VTAM and ACF/NCP. Qualified applicants must have a thorough understanding of BSC and SNA protocols, system maintenance using SMP, and IBM/370 assembler language. Background in CICS/VS helpful but not necessary.

First National Bank offers an excellent compensation and benefits package. Qualified applicants should submit resume and salary history to:

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First National Bank in Albuquerque
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Albuquerque, NM 87103

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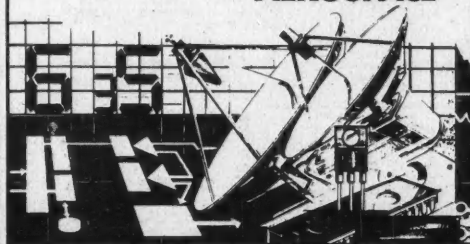
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8 to 15 years managerial experience within a business environment, proven human relations skills, and an in-depth knowledge of large scale AMDAHL and IBM computers as well as communications systems are required.

We offer a competitive salary with a full benefit plan in an excellent working environment. Qualified candidates should respond with resume, including salary history, to:



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Dr. Stuart J. Travis, Head, Computer Information Systems, Ferris State College, Big Rapids, MI 49307.

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We are accepting applications for a new position of Director of Academic Computing Services. Responsibilities include administration and coordination of academic computing services. M.S. in Computer Science, M.I.S., or related field. Three years teaching and/or academic computer experience in higher education preferred. Send resumes by 7-16-84 to:

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SYSTEMS PROGRAMMER: Computer science, math or related degree required. Responsibilities include installation, debugging, upgrading and maintaining operating systems, utility and network software on a series of computer systems including DEC and SEL UNIX operating system experience preferable.

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We can offer you an excellent income, comprehensive benefits and relocation assistance. For prompt and confidential consideration and additional information, please send resume or call: PERSONNEL SUPERVISOR, TECHNICOLOR GOVERNMENT SERVICES, INC., P.O. BOX 1242, SIOUX FALLS, S.D. 57101 (605) 594-8572.

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The ideal candidate for this position will have a working knowledge of Fortran, Software reconstruction, maintenance and troubleshooting. A definite plus would be knowledge of Harris/5 computers, HP 1000F, SEL 6750 or 8750 or Cyber 170. The applicant selected for this position will spend the first year of employment out of the Reno area at the vendor's location developing the software package and will receive per diem expense in addition to salary. After completion of this training, transfer to Reno will be effected.

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Title: Computer Specialist IV

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Minimum Qualifications: B.A. degree and 5 years experience; knowledge and experience in operating systems, experience in system design.

Salary: \$22,660 - \$35,260; starting salary normally not to exceed \$25,450.

Application Deadline: July 13, 1984

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The Computer Department provides support to both hospitals and satellite clinics. The current networked configuration includes: two Hewlett Packard 3000/III's; a Hewlett Packard 3000/33; a Honeywell L66/10; and a Cyber 18-20 plus peripheral micro computers. This configuration will soon be upgraded to include an H-P 3000 Series 48 and additional remote links. The network supports a mixture of on-line and batch systems for patient management, pharmacy, laboratory and financial/administrative applications.

Reporting to the Director of Computing Services, the Systems and Programming Manager will be expected to play a leading role in the development of a long-term computing strategy as well as being responsible for the implementation of that strategy and support of existing systems.

You will need a Bachelors Degree and have at least 10 years experience including either 3 years as a Systems and Programming Manager, or 5 years project management experience. Extensive health care experience in a large hospital environment, including system implementation and experience in the preparation of strategic plans, are essentials. Membership of a data processing and/or health care professional organisation would be advantageous.

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For further details, please write enclosing a c.v. and quoting Ref: P/RKH3055/CWO to: Kate Vincent, Personnel Officer, Allied Medical Group, 12/18 Grosvenor Gardens, London, SW1W 0DZ, England.



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This position is responsible for establishing and maintaining a systems development methodology, including documentation, quality assurance, and data and program security standards while functioning as the major liaison with internal/external auditors. A Master's Degree is preferred with a minimum of five years' experience as a business systems analyst.

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This position requires an undergraduate degree in Business or Computer Science with a proficiency in systems design and COBOL programming plus significant project management experience. A working knowledge of IMS DB/DC is an added plus.

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Duties:

Responsibilities include working with user departments and application development groups to determine the data requirements for specific projects. Developing standards and procedures regarding data usage and retention. Providing general assistance and technical support to the application development staff, as well as the user community.

Send a letter of application and a current resume to:

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Administration
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Requires solid MVS or CICS technical skills, with expertise in debugging, problem resolution, network design and tuning. Prior conversion experience from DOS/VSE to MVS, plus ACF/VTAM, ACF/NCP a plus.

COBOL PROGRAMMER

Prior IDMS or CICS programming experience for a wide range of business applications in an IBM/OS and DOS environment. Knowledge of file access methods, job control language, batch and on-line systems preferred.

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Must possess a minimum of 2 years experience operating large scale IBM mainframes and peripherals, utilizing OS/MVS/KA or OS/MVS/SP. Knowledge of communications network and DOS/VSE operating system highly desired.

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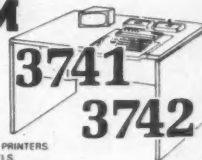


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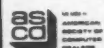
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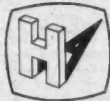
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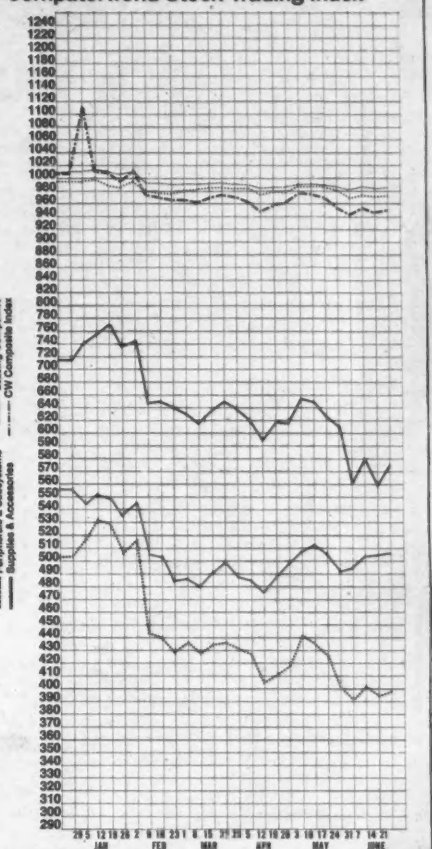
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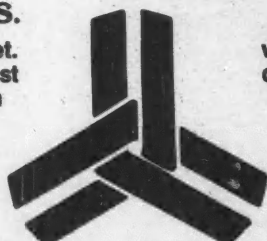
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| N | ELECTRONIC ASSOC. | 5-15 | 5 5/8 | +3/8 | +7.1 | | | D | COMPUTER SYSTEMS | 4-23 | 9 | 0 | 0.0 | | | D | LUNY SYSTEMS INC | 3-14 | 3 | -2 | -40.0 | | | | | | | | |
| N | FLOPPING POINT SYST | 13-48 | 16 1/8 | +1/8 | +0.7 | | | D | COMSHARE | 2-16 | 2 3/8 | 0 | 0.0 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | FOURSTAR | 22-47 | 28 7/8 | -1 5/8 | -5.3 | | | D | COMSHARE | 2-16 | 2 3/8 | 0 | 0.0 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| D | GENERAL AUTOMATION | 24-48 | 27 3/4 | +1/2 | +0.9 | | | N | CULLINET SOFTWARE | 24-50 | 37 | +3 1/8 | +9.2 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | GOULD INC | 24-44 | 27 3/4 | +1/2 | +0.9 | | | D | CYACOR SYSTEMS INC | 16-23 | 17 1/8 | -1/8 | -0.7 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | HARRIS CORP | 20-51 | 25 3/4 | -1 1/8 | -8.1 | | | N | ELECTRONIC DATA SYST | 25-42 | 26 1/2 | +2 | +5.7 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | HEWLETT-PACKARD CO | 22-48 | 32 | +2 1/4 | +6.4 | | | N | GENERAL ELECTRIC CO | 40-58 | 34 1/8 | +1 1/8 | +2.1 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | HONEYWELL INC | 28-88 | 53 7/8 | +1 1/4 | +0.8 | | | N | GTE CORP | 38-58 | 38 | +7/8 | +2.3 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | IBM | 57-134 | 108 1/8 | +3 3/4 | +3.3 | | | D | INFORMATICS INC | 19-33 | 22 1/4 | +3/4 | +3.4 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| D | IBM SYSTEMS INC | 3-14 | 3 | -2 | -40.0 | | | D | INFORMATION RESEARCH | 5-17 | 4 3/4 | +1/4 | +5.3 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | I/A-CORP INC | 13-35 | 15 1/4 | +1 3/8 | +7.8 | | | D | INSTRON SYSTEMS CP | 23-48 | 32 | +2 1/4 | +6.4 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | INFORMATION ASSIST | 7-26 | 23 3/4 | 0 | 0.0 | | | D | KEITHLEY ASSOCIATES | 6-11 | 5 3/4 | 0 | 0.0 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | INSTRUMENTAL ELECTRIC | 47-88 | 71 | -1 3/4 | -2.4 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KEITHLEY COMPUTER SYS | 6-18 | 7 | -1/8 | -1.8 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
| N | KODAK DATA SCS | 9-18 | 10 1/4 | +7/8 | +6.3 | | | D | LOGICON | 18-31 | 22 1/2 | +1/4 | +2.8 | | | D | MESSENGER CORP | 8-15 | 11 | +1 1/4 | +12.8 | | | | | | | | |
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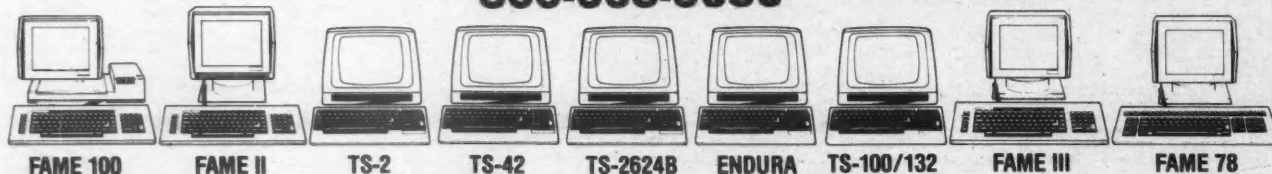


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